APPENDIX C.6

PROJECT INFORMATION

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Section | Page

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

List of Tables

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

Table | Page

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

TABLE OF CONTENTS (Continued)

List of Tables (Continued)

C.6 Project Information

Appendix C.6 provides detailed information on the projects that comprise the alternatives described in Chapter 3. Section C.6.1 provides tables that identify the projects needed to implement each alternative and option. It also identifies proposed and existing facilities for each alternative and option. Section C.6.2 provides tables that give quantitative details on the construction, operations, and decontamination and decommissioning activities associated with each project.

C.6.1 PROJECTS AND FACILITIES ASSOCIATED WITH THE ALTERNATIVES

DOE's five waste processing alternatives are:

1. No Action
2. Continued Current Operations
3. Separations
4. Non-Separations
5. Minimum INEEL Processing

For purposes of analysis, DOE has broken the actions to implement each alternative and option into discrete projects. The proposed projects associated with the waste processing alternatives are presented in Table C.6.1-1. There are multiple projects comprising an alternative or option. Some projects are used repeatedly for the various alternatives and options. Projects that are very similar between alternatives and options are generally represented by a single bounding project. Detailed information on the individual projects is provided in Section C.6.2.

C.6.1.1 No Action Alternative

Existing INTEC facilities required for the No Action Alternative would include the bin sets, Tank Farm, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-2. Table C.6.1-3 lists the projects associated with the No Action Alternative.

Table C.6.1-1. Projects at the INEEL associated with the waste processing alternatives.[a]

Project number	Project	Alternative/option
P1A	Calcine SBW Including New Waste Calcining Facility Upgrades	CCO, PB, HIP, DC
P1B	Newly Generated Liquid Waste and Tank Farm Heel Waste Management	CCO, PB, HIP, DC
P1C	Process Equipment Waste Evaporator and Liquid Effluent Treatment and Disposal Facility	EV, MIN
P1D	No Action Alternative	NAA
P1E	Bin Set 1 Calcine Transfer	NAA, CCO
P4	Long-Term Storage of Calcine in Bin Sets	NAA, CCO
P9A	Full Separations	FS
P9B	Vitrification Plant	FS
P9C	Class A Grout Plant	FS
P9J	HAW Denitration, Packaging and Cask Loading Facility	(b)
P18	New Analytical Laboratory	FS, PB, TS, HIP, DC, EV, MIN
P18MC	Remote Analytical Laboratory Operations	NAA, CCO
P23A	Full Separations	PB
P23B	Vitrification Plant	PB
P23C	Class A Grout Plant	PB
P24	Vitrified Product Interim Storage	FS, PB, MIN
P25A[c]	Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository	FS, PB, MIN
P25B[c]	Shipping HLW from INTEC to a Geologic Repository	FS, PB, MIN
P26	Class A Grout Disposal in Tank Farm and Bin Sets	FS
P27	Class A Grout Disposal in a New Low-Activity Waste Disposal Facility	FS, TS, MIN
P28A[c]	Class A Grout Shipment to Offsite Disposal Site	FS, PB
P35D	Class A Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility	FS
P35E	Class A Grout Packaging and Loading for Offsite Disposal	FS, PB, MIN
P39A	Packaging and Loading Transuranic Waste at INTEC for Shipment to the Waste Isolation Pilot Plant	TS
P39B[c]	Shipping Transuranic Waste from INTEC to the Waste Isolation Pilot Plant	TS
P49A	Transuranic/Class C Separations	TS
P49C	Class C Grout Plant	TS
P49D	Class C Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility	TS
P49E	Class C Grout Packaging and Loading for Offsite Disposal	TS
P51	Class C Grout Disposal in Tank Farm and Bin Sets	TS
P59A	Calcine Retrieval and Transport	FS, PB, TS, HIP, DC, EV, MIN
P59B[c]	Calcine Retrieval and Transport Just-in-Time	MIN
P61	Vitrified HLW Interim Storage	EV
P62A	Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository	EV
P63A[c]	Shipping Vitrified HLW from INTEC to a Geologic Repository	EV
P64D[c]	Transport of Vitrified Waste to INEEL	MIN
P64E	Vitrified Low-Activity Waste Shipment to Offsite Disposal Site	MIN
P71	Mixing and Hot Isostatic Pressing	HIP
P72	Interim Storage of Hot Isostatic Pressed Waste	HIP
P73A	Packaging and Loading Hot Isostatic Pressed Waste at INTEC for Shipment to a Geologic Repository	HIP

Table C.6.1-1. (Continued).

Project Number	Project	Alternative/option
P73B[c]	Shipping Hot Isostatic Pressed Waste from INTEC to a Geologic Repository	HIP
P80	Direct Cement Process	DC
P81	Unseparated Cementitious HLW Interim Storage	DC
P83A	Packaging and Loading Cementitious Waste at INTEC for Shipment to a Geologic Repository	DC
P83B[c]	Shipping Cementitious Waste from INTEC to a Geologic Repository	DC
P88	Early Vitrification Facility with Maximum Achievable Control Technology	EV
P90A	Packaging and Loading Vitrified SBW at INTEC for Shipment to the Waste Isolation Pilot Plant	EV
P90B[c]	Shipping of Vitrified SBW from INTEC to the Waste Isolation Pilot Plant	EV
P111	SBW and Newly Generated Liquid Waste Treatment with Cesium Ion Exchange to Contact-Handled Transuranic Grout and Low-Level Waste Grout	MIN
P112A	Packaging and Loading Contact-Handled Transuranic Waste for Shipment to the Waste Isolation Pilot Plant	MIN
P112B[c]	Shipping Contact-Handled Transuranic Waste to the Waste Isolation Pilot Plant	MIN
P112E	Shipping Transuranic Waste from INTEC to the Waste Isolation Pilot Plant	CCO, HIP, DC
P117A	Calcine Packaging and Loading to Hanford	MIN
P117B[d]	Calcine Packaging and Loading Just-in-Time	MIN
P118	Separations Organic Incinerator	FS, PB, TS
P121A[c]	Calcine Transport to Hanford	MIN
P121B[c,d]	Calcine Transport to Hanford Just-in-Time	MIN
P133	Waste Treatment Pilot Plant	FS, PB, TS, HIP, DC, EV, MIN

a. NAA = No Action Alternative; CCO = Continued Current Operations Alternative; FS = Separations Alternative/Full Separations Option; PB = Separations Alternative/Planning Basis Option; TS = Separations Alternative/Transuranic Separations Option; HIP = Non-Separations Alternative/Hot Isostatic Pressed Waste Option; DC = Non-Separations Alternative/Direct Cement Waste Option; EV = Non-Separations Alternative/Early Vitrification Option; MIN = Minimum INEEL Processing Alternative.
b. Stand-alone project; not associated with a specific waste processing alternative or option.
c. Transportation project. No project data presented in C.6.2.
d. P59A, P117A, and P121A relate to the Interim Storage Shipping scenario; P59B, P117B, and P121B relate to the Just-in-Time Shipping scenario. Section 3.1.5 explains the relationship of these two scenarios under the Minimum INEEL Processing Alternative.

Table C.6.1-2. Facilities associated with the No Action Alternative.

Facility name	Purpose
Existing Facilities	
Calcined Solids Storage Facilities (bin sets)	Stores calcined HLW.
Tank Farm	Stores liquid SBW and newly generated liquid waste.
High-Level Liquid Waste Evaporator	Concentrates SBW.
Process Equipment Waste Evaporator	Concentrates the newly generated liquid waste.
Liquid Effluent Treatment and Disposal Facility	Concentrates the acids from Process Equipment Waste Evaporator overheads.
Coal-Fired Steam Generating Facility	Provides steam for processes.
Substation	Provides electrical power for INTEC facilities.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Proposed Facilities	
Calcine Retrieval and Transport System (bin set 1 only)[a]	Retrieves calcine from bin set 1 and transports it to bin set 6 or 7.

a. As decided in the SNF & INEL EIS Record of Decision (60 FR 28680; June 1, 1995).

Table C.6.1-3. Projects associated with the No Action Alternative.

Project number	Project name
P1D	No Action Alternative
P1E	Bin Set 1 Calcine Transfer
P4	Long-term Storage of Calcine in Bin Sets
P18MC	Remote Analytical Laboratory Operation

C.6.1.2 Continued Current Operations Alternative

Existing INTEC facilities required for the Continued Current Operations Alternative would include the bin sets, Tank Farm, New Waste Calcining Facility, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-4. Table C.6.1-5 lists the projects associated with the Continued Current Operations Alternative.

C.6.1.3 Separations Alternative

DOE has selected three options for implementation of the Separations Alternative: Full Separations, Planning Basis, and Transuranic Separations. These options have similar requirements for new INTEC facilities, such as the need for a separations facility and low activity waste grouting facility. However, the specific processes that occur in each of the proposed facilities and the waste forms that would be produced differ between the options.

Full Separations Option

Existing INTEC facilities required for the Full Separations Option would include the bin sets, Tank Farm, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. Proposed facilities would include a Calcine Retrieval and Transport System, Waste Separations Facility, Vitrification Plant, Class A Grout Plant, Low-Activity Waste Disposal Facility, and Interim Storage Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-6. Table C.6.1-7 lists the projects associated with the Full Separations Option.

Planning Basis Option

Existing INTEC facilities required for the Planning Basis Option would include the bin sets, Tank Farm, New Waste Calcining Facility, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. Proposed facilities would include a Calcine Retrieval and Transport System, Waste Separations Facility, Vitrification Plant, Class A Grout Plant, Interim Storage Facility, and Newly Generated Liquid Waste Treatment Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-8. Table C.6.1-9 lists the projects associated with the Planning Basis Option.

Table C.6.1-4. Facilities associated with the Continued Current Operations Alternative.

Facility name	Purpose
Existing Facilities	
Calcined Solids Storage Facilities (bin sets)	Stores calcined HLW.
Tank Farm	Stores liquid SBW and newly generated liquid waste.
New Waste Calcining Facility	Calcines liquid SBW and newly generated liquid waste.
High-Level Liquid Waste Evaporator	Concentrates SBW and newly generated liquid waste.
Liquid Effluent Treatment and Disposal Facility	Concentrates the acids from Process Equipment Waste Evaporator overheads.
Process Equipment Waste Evaporator	Concentrates the high acid and high radioactivity newly generated liquid waste.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Coal-Fired Steam Generating Facility	Provides steam for processes.
Substation	Provides electrical power for INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System (bin set 1 only)	Retrieves calcine from bin set 1 and transports it to bin set 6 or 7.
Newly Generated Liquid Waste Treatment Facility	Concentrates and grouts the newly generated liquid waste prior to disposal at a low-level waste disposal facility.

Table C.6.1-5. Projects associated with the Continued Current Operations Alternative.

Project number	Project name
P1A	Calcine SBW Including New Waste Calcining Facility Upgrades
P1B	Newly Generated Liquid Waste and Tank Farm Heel Waste Management
P1E	Bin Set 1 Calcine Transfer
P4	Long-Term Storage of Calcine in Bin Sets
P18MC	Remote Analytical Laboratory Operation
P112E	Shipping Transuranic Waste from INTEC to the Waste Isolation Pilot Plant

Table C.6.1-6. Facilities associated with the Full Separations Option.

Facility name	Purpose
Existing Facilities	
Calcined Solids Storage Facilities (bin sets)	Stores calcined HLW until removed for chemical separation and potentially serves as a destination for Class A grout.
Tank Farm	Stores liquid SBW until removed for chemical separation and potentially serves as a destination for Class A grout.
High-Level Liquid Waste Evaporator	Concentrates SBW and newly generated liquid waste.
Liquid Effluent Treatment and Disposal Facility	Concentrates the acids from Process Equipment Waste Evaporator overheads.
Process Equipment Waste Evaporator	Concentrates the high acid and high radioactivity newly generated liquid waste.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Coal-Fired Steam Generating Facility	Provides steam for processes.
Substation	Provides electrical power for INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System	Retrieves calcine from the bin sets and transports it to the Waste Separations Facility.
Waste Separations Facility	Performs chemical separations producing the high-activity waste and low-activity waste streams.
Vitrification Plant	Converts the high-activity waste to a vitrified (glass) form.
Class A Grout Plant	Evaporates and denitrates the low-activity waste and produces a Class A grout.
Low-Activity Waste Disposal Facility	Receives containerized Class A grout for disposal.
Vitrified Product Interim Storage Facility	Provides interim storage for vitrified high-activity waste until shipped to a geologic repository.
New Analytical Laboratory	Replaces the Remote Analytical Laboratory.
Waste Treatment Pilot Plant	Develops and tests new processes

Table C.6.1-7. Projects associated with the Full Separations Option.

Project number	Project name
P59A	Calcine Retrieval and Transport
P9A	Full Separations
P9B	Vitrification Plant
P9C	Class A Grout Plant
P24	Vitrified Product Interim Storage
P25A	Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository
P25B	Shipping HLW from INTEC to a Geologic Repository
P18	New Analytical Laboratory
P118	Separations Organic Incinerator
P133	Waste Treatment Pilot Plant
	and
P35D *and*	Class A Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility *and*
P27	Class A Grout Disposal in a New Low-Activity Waste Disposal Facility
	or
P35E *and*	Class A Grout Packaging and Loading for Offsite Disposal *and*
P28A	Class A Grout Shipment to Offsite Disposal Site
	or
P26	Class A Grout Disposal in Tank Farm and Bin Sets

Table C.6.1-8. Facilities associated with the Planning Basis Option.

Facility name	Purpose
Existing Facilities	
Calcined Solids Storage Facilities (bin sets)	Stores calcined HLW until removed for chemical separation and potentially serves as a destination for Class A grout.
Tank Farm	Stores liquid SBW until removed for chemical separation and potentially serves as a destination for Class A grout.
New Waste Calcining Facility	Calcines liquid SBW and newly generated liquid waste.
High-Level Liquid Waste Evaporator	Concentrates SBW and newly generated liquid waste.
Liquid Effluent Treatment and Disposal Facility	Concentrates the acids from Process Equipment Waste Evaporator overheads.
Process Equipment Waste Evaporator	Concentrates the high acid and high radioactivity newly generated liquid waste.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Coal-Fired Steam Generating Facility	Provides steam for processes.
Substation	Provides electrical power for INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System	Retrieves calcine from the bin sets and transports it to the Waste Separations Facility.
Waste Separations Facility	Performs chemical separations producing the high-activity waste and low-activity waste streams.
Vitrification Plant	Converts the high-activity waste to a vitrified (glass) form.
Class A Grout Plant	Evaporates and denitrates the low-activity waste and produces a Class A grout.
Vitrified Product Interim Storage Facility	Stores vitrified high-activity waste in stainless steel canisters which are either stored in a modified, existing facility or placed into new concrete and steel vaults.
New Analytical Laboratory	Replaces the Remote Analytical Laboratory.
Newly Generated Liquid Waste Treatment Facility	Concentrates and grouts the newly generated liquid waste prior to disposal at a low-level waste disposal facility.
Waste Treatment Pilot Plant	Develops and tests new processes.

Table C.6.1-9. Projects associated with the Planning Basis Option.

Project number	Project name
P1A	Calcine SBW Including New Waste Calcining Facility Upgrades
P1B	Newly Generated Liquid Waste and Tank Farm Heel Waste Management
P59A	Calcine Retrieval and Transport
P23A	Full Separations
P23B	Vitrification Plant
P23C	Class A Grout Plant
P24	Vitrified Product Interim Storage
P25A	Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository
P25B	Shipping HLW from INTEC to a Geologic Repository
P18	New Analytical Laboratory
P118	Separations Organic Incinerator
P133	Waste Treatment Pilot Plant
P35E	Class A Grout Packaging and Loading for Offsite Disposal
P28A	Class A Grout Shipment to Offsite Disposal Site

Transuranic Separations Option

Existing INTEC facilities required for the Transuranic Separations Option would include the bin sets, Tank Farm, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. Proposed facilities would include a Calcine Retrieval and Transport System, Transuranic Separations Facility, Class C Grout Plant, and Low-Activity Waste Disposal Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-10. Table C.6.1-11 lists the projects associated with the Transuranic Separations Option.

C.6.1.4 Non-Separations Alternative

Hot Isostatic Pressed Waste Option

Existing INTEC facilities required for the Hot Isostatic Pressed Waste Option would include the bin sets, Tank Farm, New Waste Calcining Facility, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. Proposed facilities would include a Calcine Retrieval and Transport System, Hot Isostatic Press Facility, Interim Storage Facility, and Newly Generated Liquid Waste Treatment Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-12. Table C.6.1-13 lists the projects associated with the Hot Isostatic Pressed Waste Option.

Direct Cement Waste Option

Existing INTEC facilities required for the Direct Cement Waste Option would include the bin sets, Tank Farm, New Waste Calcining Facility, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. Proposed facilities would include a Calcine Retrieval and Transport System, Cement Facility, Interim Storage Facility, and Newly Generated Liquid Waste Treatment Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-14. Table C.6.1-15 lists the projects associated with the Direct Cement Waste Option.

Table C.6.1-10. Facilities associated with the Transuranic Separations Option.

Facility name	Purpose
Existing Facilities	
Calcined Solids Storage Facilities (bin sets)	Stores calcined HLW until removed for chemical separation and potentially serves as a destination for Class C grout.
Tank Farm	Stores liquid SBW until removed for chemical separation and potentially serves as a destination for Class C grout.
High-Level Liquid Waste Evaporator	Concentrates SBW and newly generated liquid waste.
Liquid Effluent Treatment and Disposal Facility	Concentrates the acids from Process Equipment Waste Evaporator overheads.
Process Equipment Waste Evaporator	Concentrates the high acid and high radioactivity newly generated liquid waste.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Coal-Fired Steam Generating Facility	Provides steam for processes.
Substation	Provides electrical power for INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System	Retrieves calcine from the bin sets and transports in the Transuranic Separations Facility.
Transuranic Separations Facility	Performs transuranic extraction producing the transuranic and low-activity waste streams. Dries and solidifies the transuranic waste stream.
Class C Grout Plant	Evaporates and denitrates the low-activity waste and produces a Class C grout.
Low-Activity Waste Disposal Facility	Receives containerized Class C grout for disposal.
New Analytical Laboratory	Replaces the Remote Analytical Laboratory.
Waste Treatment Pilot Plant	Develops and tests new processes.

Table C.6.1-11. Projects associated with the Transuranic Separations Option.

Project number	Project name
P59A	Calcine Retrieval and Transport
P49A	Transuranic/Class C Separations
P49C	Class C Grout Plant
P39A	Packaging and Loading Transuranic Waste at INTEC for Shipment to the Waste Isolation Pilot Plant
P39B	Shipping Transuranic Waste from INTEC to the Waste Isolation Pilot Plant
P18	New Analytical Laboratory
P118	Separations Organic Incinerator
P133	Waste Treatment Pilot Plant
	and
P49D *and*	Class C Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility *and*
P27	Class C Grout Disposal in a New Low-Activity Waste Disposal Facility
	or
P49E *and*	Class C Grout Packaging and Loading for Offsite Disposal *and*
P28A	Class C Grout Shipment to Offsite Disposal Site
	or
P51	Class C grout Disposal in Tank Farm and Bin Sets

Table C.6.1-12. Facilities associated with the Hot Isostatic Pressed Waste Option.

Facility name	Purpose
Existing Facilities	
New Waste Calcining Facility	Calcines liquid SBW and newly generated liquid waste.
High-Level Liquid Waste Evaporator	Concentrates SBW and newly generated liquid waste.
Calcined Solids Storage Facilities (bin sets)	Stores calcine from the New Waste Calcining Facility until removed by the Calcine Retrieval and Transport system and sent to the Hot Isostatic Press Facility.
Process Equipment Waste Evaporator	Concentrates the newly generated liquid waste before storing, calcining, or grouting.
Liquid Effluent Treatment and Disposal Facility	Processes the newly generated liquid waste overheads from the Process Equipment Waste Evaporator.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Tank Farm	Stores liquid SBW until removed for calcination in the New Waste Calcining Facility.
Coal-Fired Steam Generating Facility	Provides steam energy for the process.
Substation	Provides electrical power for the INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System	Retrieves calcine from the bin sets and transports it to the Hot Isostatic Press Facility.
Hot Isostatic Press Facility	Processes the calcine to produce an impervious, non-leachable glass-ceramic form.
HLW Interim Storage Facility	Provides interim storage for Hot Isostatic Pressed Waste canisters until shipped to a geologic repository.
Newly Generated Liquid Waste Treatment Facility	Concentrates and grouts the newly generated liquid waste prior to disposal at a low-level waste disposal facility.
New Analytical Laboratory	Replaces the Remote Analytical Laboratory.
Waste Treatment Pilot Plant	Develops and tests new processes.

Table C.6.1-13. Projects associated with the Hot Isostatic Pressed Waste Option.

Project number	Project name
P1A	Calcine SBW Including New Waste Calcining Facility Maximum Achievable Control Technology Upgrades
P1B	Newly Generated Liquid Waste and Tank Farm Heel Waste Management
P18	New Analytical Laboratory
P59A	Calcine Retrieval & Transport
P71	Mixing and Hot Isostatic Pressing
P72	Interim Storage of Hot Isostatic Pressed Waste
P73A	Packaging and Loading Hot Isostatic Pressed Waste at INTEC for Shipment to a Geologic Repository
P73B	Shipping Hot Isostatic Pressed Waste from INTEC to a Geologic Repository
P112E	Shipping Transuranic Waste from INTEC to the Waste Isolation Pilot Plant
P133	Waste Treatment Pilot Plant

Table C.6.1-14. Facilities associated with the Direct Cement Waste Option.

Facility name	Purpose
Existing Facilities	
New Waste Calcining Facility	Calcines liquid SBW and newly generated liquid waste.
High-Level Liquid Waste Evaporator	Concentrates SBW and newly generated liquid waste.
Calcined Solids Storage Facilities (bin sets)	Stores the HLW calcine until transported by the Calcine Retrieval and Transport system to the Direct Grouting Facility.
Process Equipment Waste Evaporator	Concentrates the newly generated liquid waste.
Liquid Effluent Treatment and Disposal Facility	Processes the newly generated liquid waste overheads from the Process Equipment Waste Evaporator.
Remote Analytical Laboratory	Perform analytical services for the process streams.
Tank Farm	Stores liquid SBW until removed for calcination in the New Waste Calcining Facility.
Coal-Fired Steam Generating Facility	Provides steam energy for the process.
Substation	Provides electrical power for the INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System	Retrieves calcine from the bin sets and transports it to the Direct Grouting Facility.
Cement Facility	Processes the calcined SBW and HLW to produce a hydroceramic form.
HLW Interim Storage Facility	Provides interim storage for cemented HLW canisters until shipped to a geologic repository.
Newly Generated Liquid Waste Treatment Facility	Concentrates and grouts the newly generated liquid waste prior to disposal at a low-level waste disposal facility.
New Analytical Laboratory	Replaces the Remote Analytical Laboratory.
Waste Treatment Pilot Plant	Develops and tests new processes.

Table C.6.1-15. Projects associated with the Direct Cement Waste Option.

Project number	Project name
P1A	Calcine SBW including New Waste Calcining Facility Upgrades
P1B	Newly Generated Liquid Waste and Tank Farm Heel Waste Management
P18	New Analytical Laboratory
P59A	Calcine Retrieval and Transport
P80	Direct Cement Process
P81	Unseparated Cementitious HLW Interim Storage
P83A	Packaging and Loading Cementitious Waste at INTEC for Shipment to a Geologic Repository
P83B	Shipping Cementitious Waste from INTEC to a Geologic Repository
P112E	Shipping Transuranic Waste from INTEC to the Waste Isolation Pilot Plant
P133	Waste Treatment Pilot Plant

Early Vitrification Option

Existing INTEC facilities required for the Early Vitrification Option would include the bin sets, Tank Farm, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. Proposed facilities would include a Calcine Retrieval and Transport System, Early Vitrification Facility, and Interim Storage Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-16. Table C.6.1-17 lists the projects associated with the Early Vitrification Option.

C.6.1.5 Minimum INEEL Processing Alternative

Existing INTEC facilities required for the Minimum INEEL Processing Alternative would include the bin sets, Tank Farm, High-Level Liquid Waste Evaporator, Process Equipment Waste Evaporator, and Liquid Effluent Treatment and Disposal Facility. Proposed facilities would include a Calcine Retrieval and Transport System, Calcine Packaging Facility, Interim Storage Facility, Sodium-Bearing Waste and Newly Generated Liquid Waste Treatment Facility, and Low-Activity Waste Disposal Facility. The existing and proposed facilities associated with this alternative are listed in Table C.6.1-18.

This alternative includes two scenarios for shipping calcine from INEEL to the Hanford Site. The first scenario is to ship the calcine during the years 2012 through 2035, which would require the Hanford Site to build canister storage buildings for interim storage of the INEEL calcine prior to treatment. Table C.6.1-19 lists the projects associated with this shipping scenario for the Minimum INEEL Processing Alternative. A second scenario is to ship calcine to the Hanford Site on a just-in-time basis, over the years 2028 through 2030. The calcine would be shipped to the Hanford Site at the rate it can be introduced directly to the treatment process, so that construction of canister storage buildings would not be necessary. Table C.6.1-19 lists the projects associated with this shipping scenario for the Minimum INEEL Processing Alternative.

In addition, this alternative would require existing and new facilities at the Hanford Site to treat the INEEL waste. The facilities and projects that would be associated with management of the calcined HLW at the Hanford Site are described in Appendix C.8.

Table C.6.1-16. Facilities associated with the Early Vitrification Option.

Facility name	Purpose
Existing Facilities	
Calcined Solids Storage Facilities (bin sets)	Stores calcine, until removed by the Calcine Retrieval and Transport system and sent to the Vitrification Facility.
High-Level Liquid Waste Evaporator	Concentrates SBW and Newly Generated Liquid Waste.
Process Equipment Waste Evaporator	Concentrates the effluents resulting from vitrification the Vitrification Facility.
Liquid Effluent Treatment and Disposal Facility	Processes the overheads from the Process Equipment Waste Evaporator.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Tank Farm	Stores liquid SBW until removed for vitrification.
Coal-Fired Steam Generating Facility	Provides steam energy for the process.
Substation	Provides electrical power for INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System	Retrieves calcine from the bin sets and transports it to the Vitrification Facility.
Early Vitrification Facility	Vitrifies SBW, newly generated liquid waste, and calcine.
HLW Interim Storage Facility	Provides interim storage for the vitrified HLW canisters until shipped to a geologic repository.
New Analytical Laboratory	Replaces the Remote Analytical Laboratory.
Waste Treatment Pilot Plant	Develops and tests new processes.

Table C.6.1-17. Projects associated with the Early Vitrification Option.

Project number	Project name
P1C	Process Equipment Waste Evaporator and Liquid Effluent Treatment and Disposal Facility
P18	New Analytical Laboratory
P59A	Calcine Retrieval and Transport
P61	Vitrified HLW Interim Storage
P62A	Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository
P63A	Shipping of Vitrified HLW from INTEC to a Geologic Repository
P88	Early Vitrification with Maximum Achievable Control Technology
P90A	Packaging and Loading Vitrified SBW at INTEC for Shipment to the Waste Isolation Pilot Plant
P90B	Shipping of Vitrified SBW from INTEC to the Waste Isolation Pilot Plant
P133	Waste Treatment Pilot Plant

Table C.6.1-18. Facilities associated with the Minimum INEEL Processing Alternative.[a]

Facility name	Purpose
Existing Facilities	
Calcined Solids Storage Facilities (bin sets)	Stores calcined HLW until removed for packaging and loading for shipment to the Hanford Site.
Tank Farm	Stores liquid SBW until removed for processing through the treatment facility.
Process Equipment Waste Evaporator	Concentrates the newly generated liquid waste.
High-Level Liquid Waste Evaporator	Concentrates SBW and newly generated liquid waste.
Liquid Effluent Treatment and Disposal Facility	Processes overheads from the Process Equipment Waste Evaporator.
Remote Analytical Laboratory	Performs analytical services for the process streams.
Coal-Fired Steam Generating Facility	Provides steam for processes.
Substation	Provides electrical power for INTEC facilities.
Proposed Facilities	
Calcine Retrieval and Transport System	Retrieves calcine from the bin sets and transports it to the Calcine Packaging Facility.
Calcine Packaging Facility	Prepares the calcine for shipment.
SBW and NGLW Treatment Facility	Processes the liquid wastes for shipment.
New Analytical Laboratory	Replaces the Remote Analytical Laboratory.
Vitrified Product Interim Storage Facility	Provides interim storage for vitrified high-activity waste until shipped to a geologic repository.
Low-Activity Waste Disposal Facility	Receives vitrified low-activity waste for disposal.
Waste Treatment Pilot Plant	Develops and tests new processes.

a. Facilities at the Hanford Site are described in Appendix C.8.

Table C.6.1-19. Projects associated with the Minimum INEEL Processing Alternative.[a]

Project number	Project name
P1C	Process Equipment Waste Evaporator and Liquid Effluent Treatment and Disposal
P18	New Analytical Laboratory
P24	Vitrified Product Interim Storage
P25A	Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository
P25B	Transport of Vitrified Waste from INEEL to a Geologic Repository
P27	Class A Grout Disposal in a New Low-Activity Waste Disposal Facility
P64D	Transport of the Vitrified Waste to INEEL
P111	SBW and Newly Generated Liquid Waste Treatment with Cesium Ion Exchange to Contact-Handled Transuranic Grout and Low-Level Waste Grout
P112A	Packaging and Loading Contact-Handled Transuranic Waste for Transport to the Waste Isolation Pilot Plant
P112B	Shipping Contact-Handled Transuranic Waste to the Waste Isolation Pilot Plant
P133	Waste Treatment Pilot Plant
	and
P59A	Calcine Retrieval and Transport
P117A	Calcine Packaging and Loading to Hanford
P121A	Calcine Transport to Hanford
	or
P59B	Calcine Retrieval and Transport Just-in-Time
P117B	Calcine Packaging and Loading Just-in-Time
P121B	Calcine Transport to Hanford Just-in-Time
P35E	Class A Grout Packaging and Loading for Offsite Disposal
P64E	Vitrified Low-Activity Waste Shipment to Offsite Disposal Site

a. Projects at the Hanford Site are described in Appendix C.8.

DOE used a systematic process to identify which existing INTEC facilities would be analyzed in detail under the facility disposition alternatives in this EIS. Detailed information regarding this process and facility disposition alternatives is provided in Section 3.2, Facility Disposition Alternatives. Existing HLW facilities would be dispositioned under all waste processing alternatives. The facility disposition alternatives are modular in nature and can be integrated with any waste processing alternative or option. Table C.6.1-20 identifies the facility disposition alternatives and the specific project associated with the dispositioning of each facility. Detailed information for the proposed projects associated with each facility closure are presented in C.6.2.

For the Tank Farm and bin sets, which together constitute the majority of the total inventory of residual radioactivity, DOE analyzed all five facility disposition alternatives. Since the residual amount of radioactive and/or chemical contaminants associated with other INTEC facilities is much less than that of the Tank Farm and bin sets, the overall residual risk at INTEC would not change significantly due to the contribution from these other facilities. For purposes of analysis, DOE assumed a single facility disposition alternative for the other INTEC HLW facilities, except for the New Waste Calcining Facility and the Fuel Processing Building and related facilities for which two facility disposition alternatives were evaluated.

Table C.6.1-20. Facility disposition alternatives.

Facility Description	Facility Disposition Alternative: Clean Closure	Performance-Based Closure	Closure to Landfill Standards	Performance-Based Closure with Class A Grout Disposal	Performance-Based Closure with Class C Grout Disposal
Tank Farm and Related Facilities					
Tank Farm[a]	P59G	P3B	P3C	P26	P51
CPP-619 – Tank Farm Area – CPP (Waste Storage Control House)			P156B		
CPP-628 - Tank Farm Area – CPP (Waste Storage Control House)			P156C		
CPP-638 – Waste Station (WM-180) Tank Transfer Building			P156E		
CPP-712 – Instrument House (VES-WM-180, 181)			P156F		
CPP-717 – STR/SIR[e] Waste Storage Tank Pads (A, B, C, and D) and Vessels			P156G		
Bin Sets and Related Facilities					
Bin sets[b]	P59F	P59C	P59D	P26	P51
CPP-639 – Blower Building/Bin Sets 1, 2, 3			P157A		
CPP-646 – Instrument Building for 2nd Set Calcined Solids			P157B		
CPP-647 – Instrument Building for 3rd Set Calcined Solids			P157C		
CPP-658 – Instrument Building for 4th Set Calcined Solids			P157D		
CPP-671 – Instrument Building for 5th Set Calcined Solids			P157E		
CPP-673 – Instrument Building for 6th Set Calcined Solids			P157F		
Process Equipment Waste Evaporator and Related Facilities					
CPP-604 – Process Equipment Waste Evaporator			P158H		
CPP-605 – Blower Building			P158A		
CPP-641 – West Side Waste Holdup	P156L				
CPP-649 – Atmospheric Protection Building			P158B		
CPP-708 – Exhaust Stack/Main Stack[c]			P158C		
CPP-756 – Pre-Filter Vault			P158D		
CPP-1618 – Liquid Effluent Treatment and Disposal Facility	P158E				
NA – PEWE[f] Condensate Lines			P154B		
NA – PEWE[f] Condensate Lines and Cell Floor Drain Lines			P154A		
Fuel Processing Building and Related Facilities					
CPP-601 – Fuel Processing Building		P160E	P160A		
CPP-627 – Remote Analytical Facility Building		P160F	P160C		
CPP-640 – Head End Process Plant		P160G	P160D		
FAST and Related Facilities					
CPP-666 – Fluorinel Dissolution Process and Fuel Storage Facility		P161A			
CPP-767 – Fluorinel Dissolution Process and Fuel Storage Facility Stack	P161B				

Table C.6.1-20. (Continued).

Facility Description	Clean Closure	Performance-Based Closure	Closure to Landfill Standards	Performance-Based Closure with Class A Grout Disposal	Performance-Based Closure with Class C Grout Disposal
Transport Lines Group					
NA – Process Offgas Lines		P162C			
NA – High-Level Liquid Waste (Raffinate) Lines			P162A		
NA – Process (Dissolver) Transport Lines		P162D			
NA – Calcine Solids Transport Lines			P162B		
Other HLW Facilities					
CPP-659 – New Waste Calcining Facility[d]		165A	165B		
CPP-684 – Remote Analytical Laboratory		P159			

Note: Column headers fall under the spanning heading "Facility Disposition Alternative".

a. The INTEC Tank Farm consists of underground storage tanks, concrete tank vaults, waste transfer lines, valve boxes, valves, airlift pits, cooling equipment, and several small buildings containing instrumentation and valves for the waste tanks. Includes waste storage tanks (VES-WM-180 through 190), Tank Vaults for Tanks VES-WM-180 through 186 (CPP-780 through 786), Tank Enclosure for Tanks VES-WM-187 through 190 (CPP-713), and facilities CPP-721 through 723, CPP-737 through 743, and CPP-634 through 636, and CPP-622, 623, and 632.
b. The bin sets consist of ancillary structures, instrument rooms, filter rooms, cyclone vaults, and stacks, including CSSF-1 through 7, CPP-729, CPP-732, CPP-741 through 742, CPP-744, CPP-746 through 747, CPP-760 through 761, CPP-765, CPP-791, CPP-795, and CPP-1615.
c. Includes the instrument building for Main Stack CPP-692 and waste transfer line valve boxes.
d. Includes Organic Solvent Disposal Building CPP-694.
e. STR = Submarine Thermal Reactor, SIR = Submarine Intermediate Reactor
f. PEWE = Process Equipment Waste Evaporator.

This page intentionally left blank.

C.6.2 PROJECT SUMMARIES

Waste Processing Projects

C.6.2.1 Calcine SBW Including New Waste Calcining Facility Upgrades (P1A)

PROJECT DESCRIPTION: Four waste processing alternatives/options (Continued Current Operations Alternative, Planning Basis Option, Hot Isostatic Pressed Waste Option, and Direct Cement Waste Option) require that liquid sodium-bearing waste (SBW) be calcined prior to further processing, storage, or disposal. To accomplish that objective, modifications and additions to the New Waste Calcining Facility (NWCF) and a new storage tank would be required. The modified calcining facility would process all SBW by the end of 2014, but would remain operational through 2016 in preparation for closure.

PROJECT DETAILS

NWCF Upgrades

In order to obtain an operating permit from the State of Idaho, the NWCF would have to undergo certain modifications to comply with the expected maximally achievable control technology (MACT) requirements for air emissions. Also, to calcine the liquid waste more efficiently the calciner must operate at a higher temperature than used in previous campaigns. The project data sheet reflects construction and decontamination and decommissioning, but not NWCF operations.

Baseline Information

- The calciner would operate at 600°C and would convert SBW to calcine. Startup and operational testing of the upgraded calciner would occur in 2009-2010.
- Nearly all SBW would be calcined by the end of 2014; however, the calciner may continue operations until 2016, at which time the calciner may have completed calcination of its own Type-I beds, for decontamination purposes.
- The MACT and high-temperature upgrades would be operational by 2009, when the calciner would undergo startup and operational testing.

Table C.6.2-1. Construction project data for the new liquid waste storage tank for the Calcine SBW Including New Waste Calcining Facility Upgrades (P1A)

Table C.6.2-2. Construction project data for the New Waste Calcining Facility MACT Compliance Facility for the Calcine SBW Including New Waste Calcining Facility Upgrades (P1A)

Table C.6.2-3. Operations project data for combined operations of facilities for the Calcine SBW Including New Waste Calcining Facility Upgrades (P1A)

Table C.6.2-4. Decontamination and decommissioning project data for the new liquid waste storage tank for the Calcine SBW Including New Waste Calcining Facility with Upgrades (P1A)

Table C.6.2-5. Decontamination and decommissioning project data for the New Waste Calcining Facility MACT Compliance Facility for the Calcine SBW Including New Waste Calcining Facility with Upgrades (P1A)

C.6.2.2 Newly Generated Liquid Waste and Tank Farm Heel Waste Management (P1B)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide design, construction, startup, operation, and decommissioning of a new facility to treat and stabilize newly generated liquid waste and Tank Farm heel waste. The project would be conducted in support of the four waste processing alternatives/options: Continued Current Operations Alternative, Planning Basis Option, Hot Isostatic Pressed Waste Option, and Direct Cement Waste Option.

PROJECT DESCRIPTION: The treatment facility would begin processing liquid waste in 2015. Until that time, newly generated liquid waste would be stored in the existing Tank Farm tank WM-190. The project addresses three treatment processes:

- Treatment and stabilization of the newly generated liquid waste would occur over the time period of 2015 through 2035. The proposed project would result in the design, construction, and operation of a new facility to treat and stabilize newly generated liquid waste that has been concentrated by evaporation in the Process Equipment Waste Evaporator and Liquid Effluent Treatment and Disposal Facilities. After cesium and undissolved solids are removed from the waste, the remaining waste would be concentrated further in an evaporator, neutralized, stabilized in a grout mixture, and placed in 55-gallon drums for disposal at INEEL as Class-A, low-level waste.

- In-situ removal of cesium from the tank heels would occur over the time period of 2015 through 2016. The proposed project, which relies on the solubility of cesium in water, would utilize equipment within the new Newly Generated Liquid Waste Facility. Process water would be pumped into the tanks from CPP-603, the waste heel would be agitated via a jet pump, and undissolved solids would be allowed to settle. Subsequently, clarified water containing cesium would be decanted from the tanks and processed in an ion-exchange column. The processed water would be piped into a second tank for further cesium removal. After the small amount of cesium-saturated resin has been dried, it would be stored in the bin sets with calcine.

- The remaining tank heel waste would be stabilized over the time period of 2016 through 2020. Processing would occur within the new Newly Generated Liquid Waste Facility. Process water would be pumped into the tanks from CPP-603; the waste heel would be agitated via a jet pump, and drained from the tank into the evaporator. After concentration, the waste would be dried, packaged, and readied for shipment to WIPP.

Additional evaluation would be required during design to establish the requirements and design of the filtration device for the removal of undissolved solids. Different filtration systems may be required for the three processes.

NEW FACILITY DESCRIPTION: The new facility would be located in the northwest corner of the INTEC. The 2-story building is above grade with the exception of below grade canyon areas for process lines. The areas of the building requiring the most radiological shielding (5-feet thick concrete walls) are the ion exchange rooms and the packaging and loading high bay. These areas are centrally located in the facility. Except for the raw grouting and neutralization material rooms, the processing rooms are considered radiation areas with remote operations. The newly generated liquid waste is brought to the facility through a new underground pumping/piping system. No previously undisturbed land would be affected by the project.

The packaging and loading area is a shielded high bay which accommodates the remote handling of the undissolved solids and spent sorbant containers. The dried, RH-transuranic waste would be packaged in WIPP half-canisters (0.4 m^3 capacity) for disposal at WIPP, the cesium resin would be placed in the bin sets with calcine, and the remaining grouted low-level waste would be disposed of at INEEL.

Table C.6.2-6. Construction and operations project data for Newly Generated Liquid Waste and Tank Farm Heel Waste Management (P1B).

Table C.6.2-7. Decontamination and decommissioning project data for Newly Generated Liquid Waste and Tank Farm Heel Waste Management (P1B)

This page intentionally left blank.

C.6.2.3 Process Equipment Waste Evaporator and Liquid Effluent Treatment and Disposal Facility (P1C)

GENERAL DESCRIPTION: Two of the high-level-waste-treatment options require a separate project to concentrate the dilute, newly generated-liquid wastes prior to their treatment for disposal or transport. This project runs from 2000 through 2035, except for the Tank Farm portion, which only runs through 2014. The waste treatment would utilize existing facilities: the Process Equipment Waste Evaporator and the Liquid Effluent Treatment and Disposal Facility; thus, no construction activities are necessary for this project.

The Process Equipment Waste Evaporator (PEWE) uses steam from the steam plant to concentrate liquid wastes to a particular specific gravity. Vapors from the evaporator are condensed and sent to the Liquid Effluent Treatment and Disposal Facility, a fractionator for recycling acids. The feed rate into the Process Equipment Waste Evaporator limits the emissions from the Liquid Effluent Treatment and Disposal (LET&D) Facility to comply with the RCRA limits. For Type-II liquid waste (see P111 for definitions of Type-I and Type-II Newly Generated Liquid Wastes), the feed rate is 400 gal/hr. The concentrated liquid from the evaporator is returned to storage while awaiting further processing. The PEW evaporator would concentrate an average of 105,000 gallons per year of Type-II liquid waste to 5,000 gallons at a rate of 400 gal/hr.

Since the calciner is not used in the treatment options requiring this project, no new Type-I waste would be generated, except for incidental amounts from the Filter Leach Facility. Therefore, the evaporator would concentrate only small amounts of Type-I waste that could be diluted with Type-II waste.

Table C.6.2-8. Construction and operations project data for the PEW Evaporator and LET&D Facility (P1C)

C.6.2.4 No Action Alternative (P1D)

GENERAL DESCRIPTION: This No Action Alternative starts in the year 2000 and continues through 2035, which is the end for the 1995 Settlement Agreement. Because there is no construction needed in this option, there would be no decontamination, decommissioning, and demolition; only operations are included.

The calciner at the New Waste Calcining Facility (NWCF) would not operate after June 2000, and would not be upgraded during the period of interest. Rather, it would not be operating, requiring minimum maintenance by a small crew, and its buildings would be heated during the winters.

The bin sets at the Calcined Solids Storage Facility would be prepared for long-term monitoring by isolating their vaults from the atmosphere and adding a pair of small HEPA filters to accommodate bin sets 1-3. Personnel would be shared from NWCF's small crew to monitor the bin sets through 2035. The filter leach facility, also located at NWCF, would continue to operate until 2009, when tanks WM-100-102 (54,000-gal total capacity) would be full of Type I liquid wastes (see C.6.2.36 - P111 for definitions of Type I and Type II newly generated liquid wastes).

Certain INEEL facilities would continue to generate or process liquid waste that would be stored in "permitable" tanks, such as WM-190 (300,000-gal capacity for Type II liquid wastes), and WM-100-102 (54,000-gal total capacity for Type I liquid wastes). When those tanks are full (2009 for WM-100-102 and 2017 for WM-190), all liquid waste generation must cease, or other processing and disposal arrangements would be necessary.

The Process Equipment Waste Evaporator and Liquid Effluent Treatment and Disposal Facility would be used to concentrate liquid wastes prior to storage. Additionally, the High-Level Liquid Waste Evaporator would also operate until June 2001. The pH of the wastes to be stored in WM-190 after evaporation must be neutral so that WM-190's vault may be approved as secondary containment. The Process Equipment Waste Evaporator, Liquid Effluent Treatment and Disposal Facility, service waste system, offgassystems, and Tank Farm operations would continue to operate through 2017; thereafter, only a small crew would be needed to monitor and maintain them. The Remote Analytical Laboratory would operate through 2017 to characterize the liquid wastes pertaining to the HLW program.

It is assumed that the State of Idaho would issue a RCRA, Part-B permit every five years to cover all waste treatment facilities.

Table C.6.2-9. Construction and operations project data for the No Action Alternative (P1D)

C.6.2.5 Bin Set 1 Calcine Transfer (P1E)

PROJECT DESCRIPTION: The No Action Alternative and the Continued Current Operations Alternative require that the calcine contained in bin set 1 be moved to a seismically-compliant bin set with sufficient available space, because bin set 1 does not meet the seismic requirements. Bin sets 6 and 7 meet these requirements and, since they are virtually identical, the cost to transfer calcine from bin set 1 to either bin set 6 or 7 would be the same.

A potential problem with this project is that the soil around the bin sets may be contaminated. Soil samples would be needed to determine if the soil is contaminated and to what degree. Should the soil be heavily contaminated, it becomes much more costly to remove, treat, and dispose of. Determining such increased treatment and disposal costs are beyond the scope of this project.

Schedule: This project would start in the year 2000, after the Record of Decision. Activities such as design, environmental permitting, mock-up, and safety documentation would run from 2000 through 2004. Construction, SO tests, and the operational readiness review would occur between 2005 and 2012, with the actual calcine transfer requiring one year, during 2012.

Specifics: To access the top of the concrete vault surrounding bin set 1, several feet of soil would be excavated and the original superstructure removed. A new concrete slab would then be installed on top of the vault's roof for stability. Retaining walls would also be installed between bin sets 1-2 and 1-3, to support the shielding earth berms flanking bin set 1. At least two risers (pipes) would be welded remotely to the top of each annular bin within bin set 1 by drilling and removing the cores from the thick concrete-vault's roof and then piercing the tops of the bins. Similarly, at least one riser would be installed in each of the center cylindrical bins. Flexible suction and blower tubes would be installed along with the transport piping between the annular bins in bin set 1 and a new cyclone that would be installed above bin set 7 to ensure that the transferred calcine is separated from the transport air. A new blower/HEPA filter system having a capacity of 500 lbs/hr would be installed.

It would take approximately 1,100 hours to transfer the bulk calcine from bin set 1 to bin set 7 and another 1,500 to 3,000 hours to transfer the fines, not including the time it would take to move equipment from bin to bin within bin set 1. This schedule requires two, 10-hour shifts, 4-days per week, with an additional shift working 12-hours per day for the other three days. Each shift would consist of four people: one supervisor-operator, two additional operators, and a radiation-control technician. Six additional support people (engineer, technician, administrator, and three maintenance workers) would be required, bringing the total to 18.

Baseline information

The following information may include certain assumptions that pertain to this project:

- As part of the INEEL's infrastructure, a low-level waste landfill would be available to dispose of contaminated soil and concrete removed from the bin set 1 superstructure and for other miscellaneous low-level and incidental wastes generated during this project.

- One year is sufficient for three full-time crews to transfer the calcine from bin set 1 to bin set 7, and to remove enough of the fines so bin set 1 would be prepared for closure.

- Low-level and incidental radioactive wastes that include small amounts of calcine (the HEPA filters, for example) are listed under mixed hazardous wastes. The filters would be leached and the remnants disposed of at INEEL. This project assumes that an INEEL facility would be available (through the INEEL's infrastructure) for such purpose.

Table C.6.2-10. Construction and operations project data for the Bin Set 1 Calcine Transfer (P1E)

C.6.2.6 Long-Term Storage of Calcine in Bin Sets (P4)

PROJECT DESCRIPTION: This project consists of long-term storage of calcine, and monitoring and performing occasional maintenance on the calcined-solids storage facility (CSSF, commonly called bin sets) from 1999 indefinitely. There are seven bin sets and each bin set contains several individual storage units that contain a radioactive, granular-solid waste form called calcine. Each bin set is surrounded by a concrete vault. All of the sodium-bearing waste would have been converted to calcine by 2014, and all of the calcine would have been stored in the bin sets by the end of 2014; no new waste would be added to the bin sets after that.

Prior to long-term storage, a few modifications must be made to the bin sets. A pair (in series) of small (6-inch) HEPA filters must be added to the bin set groups 1, 2, and 3. Furthermore, each bin set's vault must be isolated from the atmosphere, except for bin set 1, which is already isolated.

Long-term storage would consist of the following items:

- Having a health-physicist monitor each of the continuous air monitors daily to check for potential leaks, which may take 1-2 hours to do,

- Every six months, a technician would monitor the temperatures in the bin sets via thermocouple readings,

- Once a year, a technician would calibrate the thermocouple instrumentation, and

- Approximately every 20 years, the 10 HEPA filters may need to be replaced. It is not known how frequently these filters would have to be replaced; they are not expected to be heavily contaminated, but their integrity may degrade in the radiation field over a long time.

Table C.6.2-11. Construction and operations project data for the Long-Term Storage of Calcine in Bin Sets (P4)

C.6.2.7 Full Separations (P9A & P23A)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide for a Full Separations Waste Separations Facility (WSF) and smaller, related facilities, including the Bulk Chemical Storage Facility, the Condensate Collection Facility, the Calcine Dissolution Facility, and the Low Activity Waste Collection Facility.

PROCESS DESCRIPTION: The Waste Separations Facility receives liquid sodium-bearing waste (SBW) from the Tank Farm Facility and solid calcine from the Calcined Solids Storage Facility (CSSF or bin sets). After some initial treatment of these feed streams, the radionuclides are chemically separated into two streams: a high-activity waste stream containing the transuranic nuclides, cesium and strontium, and a low activity waste stream containing the rest of the waste constituents. After the separation process, the high-activity waste and low-activity waste streams are routed to other facilities (addressed as separate projects) for further treatment.

SBW would be transferred from Tank Farm tanks to a storage tank in WSF. The SBW would then be filtered to remove undissolved solid particles before further processing. Calcine retrieval from the CSSF is addressed as a separate project. After the calcine is received at the Calcine Dissolution Facility (an addition to the Waste Separations Facility), it is dissolved in nitric acid, filtered, and then fed to the Waste Separations Facility for further processing.

After filtration of either SBW or dissolved calcine, the waste is sent through ion exchange columns to remove cesium. After cesium removal, actinides are removed from the waste by the transuranic extraction process.

Transuranic Extraction is a solvent extraction process that removes dissolved actinides from a liquid. The organic solvent extracts a high percentage of actinides from the aqueous feed and also extracts a portion of other radioactive and nonradioactive ions. To minimize the partitioning of these non-actinide species into the solvent, the solvent is "scrubbed" with a weak nitric acid solution that back-extracts most of the non-actinide species into the scrub effluent, which is combined with the feed. The solvent is then "stripped" of actinides by contacting it with a weak nitric acid solution containing 1-hydroxyethane 1,1 diphosphonic acid. The strip solution removes the actinides and a few other metal ions such as molybdenum and zirconium. The solvent is then contacted with an aqueous sodium carbonate solution to remove additional ions, primarily mercury. Contact with the carbonate solution also neutralizes acid present in the solvent and removes organic degradation products. Finally the solvent is contacted with weak nitric acid to re-acidify the solution, which is then recycled back to the front end of the transuranic extraction process.

Mixing and separation of the various solutions in the transuranic extraction process takes place in a series of centrifugal contactors. The centrifugal contactors provide high aqueous organic interface to promote mixing and then accomplish quick separation between the organic and aqueous phases to minimize degradation of the organic solvent.

A portion of the carbonate wash solution is sent to a mercury removal system, in which dissolved mercury in the waste is reduced to elemental mercury using formic acid. The metallic mercury is then amalgamated and packaged for storage and disposal.

Strontium is removed in a strontium extraction process, which like the transuranic extraction process uses a series of centrifugal contactors to mix and separate an organic solvent and an aqueous stream. Following extraction of strontium into the solvent, the solvent is scrubbed with 2 molar nitric acid, the strontium removed (or "stripped") using 0.01 molar ammonium citrate, washed with sodium carbonate and rinsed with nitric acid to reacidify the solvent. The carbonate wash effluent is sent to a mercury removal system, similar to that described for the transuranic extraction wash. The strontium extraction strip effluent is concentrated by evaporation and sent to the High Activity Waste Treatment Facility. The strontium extraction rinse effluent and raffinate are sent to the Low Activity Waste Treatment Facility.

FACILITY DESCRIPTIONS: The smaller, related facilities associated with the Waste Separations Facility are the:

- Bulk Chemical Storage Facility, a steel-framed structure that is used for storage of non-radioactive bulk chemicals needed for processing.

- Low Activity Waste Collection Facility, a concrete shielded structure containing tanks that collect low activity waste from various locations at the INTEC. This facility houses three collection tanks. Each LAW collection tank has a 303 m^3 capacity (80,000 gal). The three tanks are located on one side of the facility behind a shield wall. The pumps used to transfer the low-activity waste liquids to the Waste Separations Facility are located on the other side of the wall.

- Condensate Collection Facility, a steel-framed structure housing tanks that collect condensed steam (non-radioactive) from various process and building users before transfer back to the steam plant.

- Calcine Dissolution Facility, an addition to the Waste Separations Facility in which the retrieved calcine is dissolved in nitric acid before passing it on, as a liquid, to the separations processes.

The Waste Separations Facility is designed to house the equipment and systems for separating the SBW and calcine into high-activity waste and low-activity waste streams. It is based on a concept of centrally located, below grade, process cells with thick concrete walls surrounded by areas that contain progressively less radioactive hazards. Equipment that is in highly radioactive service and not expected to require maintenance (e.g., tanks) is located in the ten central cells. Equipment in radioactive service that would require maintenance is located in corridors (pump and valve corridors) that are adjacent to the process cells. Finally, personnel access corridors are located outside the pump and valve corridors and allow visual access to the pump and valve corridors via shielded windows. Stainless steel liners are provided in areas in where equipment and valves create a need for spill protection and decontamination.

In addition to the cells housing the process equipment, there would be three additional cells located at the north end of the facility. These cells are the manipulator repair cell, for repair of manipulators and other equipment, a decontamination cell, for decontamination of equipment prior to maintenance activities, and a filter leach cell, in which process filters are treated (by leaching in nitric acid) to remove much of the contamination before they are disposed of.

Table C.6.2-12. Construction and operations project data for Full Separations (P9A)

Table C.6.2-13. Decontamination and decommissioning project data for Full Separations (P9A)

Table C.6.2-14. Construction and operations project data for Full Separations (P23A)

Table C.6.2-15. Decontamination and decommissioning project data for Full Separations (P23A)

This page intentionally left blank.

C.6.2.8 Vitrification Plant (P9B & P23B)

GENERAL PROJECT OBJECTIVE: The proposed project provides for the design, construction, startup, operation, and decommissioning of the Vitrification Plant, designated the High Activity Waste Treatment Facility, for the Early Separations option. The Vitrification Plant receives liquid high-activity waste from a chemical separation process and converts it to a glassy solid form by mixing the waste with glass frit and processing it through a crucible melter. The finished product would meet the requirements for disposal at a national geologic repository.

PROJECT DESCRIPTION: The Vitrification Plant receives concentrated high-activity waste from the Waste Separations Facility. This high-activity waste is the product of a process that chemically separates various radionuclides from the liquid sodium-bearing waste (SBW) and granular solid calcined material that is currently stored at INTEC. After the transuranic nuclides, cesium and strontium, would be removed from the SBW and dissolved calcine, they would be concentrated in an evaporator and transferred to the Vitrification Plant. The concentrated liquid stream would be combined with spent resin from the cesium ion exchange columns, undissolved solids from the SBW and calcine treatment, and glass frit. The resulting slurry would then be introduced into a melter, where it is melted into a homogeneous, molten glass. The glass would then be poured into canisters. After allowing the canisters to cool for about 24 hours, the canister lid is welded to the canister body and the assembly would be decontaminated before being transferred to another facility for interim storage.

FACILITY DESCRIPTIONS: The Vitrification Plant would be divided into four main processing cells, the feed preparation cell, the pouring, vitrification, and breakdown cell, the offgas treatment cell, and the transfer welding cell. The feed preparation cell would contain the feed staging tank, solids storage tank, undissolved SBW solids tank, and the melter feed tanks. These tanks would be used to sample and blend the feed for glass formulation and waste form qualification purposes. The pouring vitrification and breakdown cell would contain the melter, canister pouring equipment, and dust scrubber. It also would contain the mechanical dismantling (breakdown equipment) used to reduce the size of equipment that is to be disposed of. The offgas cell would contain the equipment to treat the offgas from the melter. The transfer welding cell would contain equipment for welding of the canister lids, decontamination of the canisters, and radiological survey of the cleaned canisters. Rooms housing support equipment, clean chemical storage and supply, etc. would be located around and above these process cells.

Table C.6.2-16. Construction and operations project data for the Vitrification Plant (P9B)

Table C.6.2-17. Decontamination and decommissioning project data for the Vitrification Plant (P9B)

Table C.6.2-18. Construction and operations project data for the Vitrification Plant (P23B)

Table C.6.2-19. Decontamination and decommissioning project data for the Vitrification Plant (P23B)

This page intentionally left blank.

C.6.2.9 Class A Grout Plant (P9C & P23C)

GENERAL PROJECT OBJECTIVES: This project describes the costs and impacts of one of the facilities supporting that alternative, the Class A Grout Plant, designated the Low Activity Waste Treatment Facility.

PROCESS DESCRIPTION: The Class A Grout Plant receives concentrated low-activity waste from another facility, the Waste Separations Facility. This low-activity waste is the product of a process that chemically separates various radionuclides from the liquid sodium-bearing waste and granular solid calcined material that is currently stored at INTEC. After the transuranic nuclides, cesium, and strontium are removed from the SBW and dissolved calcine, the solution containing the remaining radionuclides would be concentrated in an evaporator and transferred to the Class A Grout Plant. The concentrated stream would be subjected to a high temperature denitration process. The denitration would be accomplished in a fluidized bed that uses air as the fluidization gas and burns kerosene with oxygen to provide the reaction temperature. The nitrates in the concentrated liquid stream are evolved as nitrogen oxides. Offgas from the denitrator would be treated to reduce emissions of unburned hydrocarbons and nitrogen oxides to acceptable levels. Solids from the denitrator are pneumatically conveyed to a storage bin. At intervals (currently assumed to be about once per month) the solids would be combined with Portland cement, blast furnace slag and flyash to form a LLW grout. Based on the concentrations of nuclides in this mixture, the grout is expected to meet the definition of Class A LLW, as given in 10 CFR 61. This project ends with the grout ready to be pumped (pump included with this project) to disposal facilities or LLW containers. The packaging for disposal and disposal facilities are addressed in other projects.

FACILITY DESCRIPTIONS: The Class A Grout Plant is about 57-m (187-ft) long (north-south) and about 43-m (144-ft) wide (east-west). It would extend about 22-m (72-ft) above grade and about 12-m (40-ft) below grade. The areas that contain radioactive material are generally located below grade, in a central concrete core. Hatches in the tops of the cells would be provided for initial installation of this equipment and non-routine access later. The cell floors and walls would be lined with stainless steel to allow easy decontamination. The process areas would be located on the lower level, and consist of a number of cells that contain the waste feed storage tanks, the denitrator, offgas treatment equipment, solids separation and storage equipment, and grout mixing and pumping equipment. A decontamination cell would also be located on the lower level and provides an area where equipment can be decontaminated before hands-on maintenance is performed.

As in any nuclear facility, the Class A Grout Plant would be divided into ventilation zones depending on the potential for contamination. Pressure differentials would be maintained so that air flows from areas of lowest contamination potential to areas of highest contamination potential. The areas of highest potential for contamination would be maintained at the lowest pressure (typically -0.75 in. of water). Administrative areas with no contamination potential (designated clean areas) would be ventilated using separate systems designed to commercial standards.

Table C.6.2-20. Construction and operations project data for the Class A Grout Plant (P9C)

Table C.6.2-21. Decontamination and decommissioning project data for the Class A Grout Plant (P9C)

Table C.6.2-22. Construction and operations project data for the Class A Grout Plant (P23C)

Table C.6.2-23. Decontamination and decommissioning project data for the Class A Grout Plant (P23C)

C.6.2.10 HAW Denitration, Packaging and Cask Loading Facility (P9J)

GENERAL PROJECT OBJECTIVES: The project included activities that would be associated with the construction and operation of a facility that would use evaporation and denitration technology to process the high-activity waste (HAW), load the waste into drums, and load the drums into a shipping cask. This facility would be called the HAW Denitration, Packaging and Cask Loading Facility.

PROCESS DESCRIPTION: The process would solidify the transuranic, strontium, and cesium ion exchange effluent streams for packaging and shipment to another facility for further treatment (vitrification). The objective would be to produce a dry material meeting shipping requirements that would minimize handling costs and impacts to the vitrification facility.

The waste solutions from the TRUEX and strontium extraction processes and the effluent from the cesium ion exchange would be mixed in a tank. The waste solution would be sent to an evaporator to concentrate the waste. The volume of the waste solution would be reduced by a factor of 66. The water vapor from the evaporation would be condensed and processes as low-level waste. The evaporator bottoms would be sent to the denitration process to be transformed into a solid waste suitable for shipping.

The denitrator would be a fluidized bed reactor. The evaporator bottoms, mixed with a 2.2M aluminum nitrate solution would be fed into the bed. Kerosene and oxygen would also be fed into the reactor to maintain the reactor temperature of about 600° C. The aluminum nitrate reacts with the waste to form solid pellets (calcine).

The solid pellets would be separated from the fluidizing air by cyclones. The solids would be stored for packaging and shipment. The offgaswould be cleaned by the MACT facility to remove environmental hazards such as organic vapors and mercury. The dried waste would be loaded into a shipping canister and sent to the vitrification facility.

FACILITY DESCRIPTION: The HAW Denitration, Packaging and Cask Loading Facility would consist of two buildings, one containing the process equipment and the other would be used to receive the drums from the process building and load them into a shipping cask. The process building would be 210 feet long and 142 feet wide. The drum handling building would be 160 feet long and 42 feet wide.

The process building would be designed to house the equipment and systems for evaporation, denitration, and packaging of the high-activity waste into drums. The process cells would be centrally located with thick concrete walls surrounded by areas that contain progressively less radioactive hazards. The equipment in radioactive service that would require maintenance would be located in corridors (pump and valve corridors) that are adjacent to the process cells. Finally, an operating corridor would be located outside of the radioactive process cells. Stainless steel liners would be provided in areas where equipment and valves create a need for spill protection and decontamination.

The drum handling building would receive a high-activity waste filled drum from the process building on a transfer cart. A transfer tunnel would connect the process building to the drum handling building. The drum would be pulled from the cart up into a drum-handling machine. The drum would be then lowered from the drum handling machine into the cask.

Table C.6.2-24. Construction and operations project data for the HAW Denitration, Packaging and Cask Loading Facility (P9J).

Table C.6.2-25. Decontamination and decommissioning project data for the HAW Denitration, Packaging and Cask Loading Facility (P9J).

This page intentionally left blank.

C.6.2.11 New Analytical Laboratory (P18)

GENERAL PROJECT OBJECTIVES: The analytical laboratory project provides environmental and regulatory required sample analysis for the waste processing alternatives. The laboratory work would include analyses of samples required for process and criticality control, start-up tests, environmental permits, and for other project specific, environmental and regulatory required purposes. The typical types of analysis would be for metals and other inorganic species, organic chemicals, radiological samples, pH, CI, F, SO_4 NO_3 TOC, gross α, β, and γ, % solids, etc.

PROCESS DESCRIPTION: The information contained in this project summary is based on the laboratory needs for the Full Separations Option which would represent the bounding case for impacts. The analytical work would be handled by the existing Remote Analytical Laboratory and a new Environmental Analytical Laboratory. The existing Remote Analytical Laboratory would be used for analyses of samples required for process and criticality control studies and for environmental and regulatory required tests. The normal daily load for the Remote Analytical Laboratory is anticipated to be in the range of 48 samples requiring 153 analyses. The Environmental Analytical Laboratory is needed to handle the samples required for the environmental and regulatory compliance purposes because of the large number of samples and sample volumes required for such studies. The Environmental Analytical Laboratory is designed to accommodate the larger size samples taken for the environmental permits.

The Environmental Analytical Laboratory would be in operations from 2015 through 2040. The existing Remote Analytical Laboratory is reportedly scheduled for shutdown in 2020. There would be a heavy sampling and analytical workload during the initial trial-burn testing and the initial operations. However, the environmental and regulatory required sampling and analyses would be substantially reduced by the year 2020. This would allow the new laboratory to accommodate all the analytical work required without further need for the existing Remote Analytical Laboratory after 2020.

The Remote Analytical Laboratory receives samples via a pneumatic transfer system for analysis. It contains a large hot cell where analyses can be performed on radiological samples. The new Environmental Analytical Laboratory would have capability similar to the Remote Analytical Laboratory for remote analyses of the samples. Process analytical samples from the facilities would be delivered to the laboratories in new pneumatic transfer system lines similar to the one used to transfer samples from the New Waste Calcining Facility to the Remote Analytical Laboratory.

The existing pneumatic transfer system is capable of transporting up to 50-milliliter sample bottles between the New Waste Calcining Facility and the Remote Analytical Laboratory. The sample size may need to be increased to as much as 1-liter to perform more analytical work for compliance verification. Currently, studies are underway at the INTEC to evaluate the conditions that allow transportation of large sample volumes (approximately 500-milliliters) via the existing pneumatic transfer system.

The pneumatic transfer system consists of two runs of metallic tubing that connect the New Waste Calcining Facility hot cell to the Remote Analytical Laboratory hot cell. Between the two buildings, the tubing is held above ground level (approximately 20-30 feet) by a series of metal supports. Small plastic transfer canisters containing sample bottles are pneumatically propelled through the tubes. The plastic canister, commonly called a rabbit, is shaped like a dumbbell and contains padding to protect the sample bottle while in transit. The rabbits are routinely used to transport 15-milliliter bottles. The padding can be removed to allow the transport of up to 50-milliliter sample bottles.

FACILITY DESCRIPTION: The existing Remote Analytical Laboratory is located in CPP-684, about 200 yards from the New Waste Calcining Facility. The Remote Analytical Laboratory is a prefabricated/modular building with the total area of approximately 1,115 meters^2 (12,000 feet^2). The new Environmental Analytical Laboratory would be located in the north corner of the INTEC (inside the INTEC fence). The building floor plan of the Environmental Analytical Laboratory would occupy an area of 25 meters (82 feet) by 34.1 meters (112 feet), consisting of two levels with the total area of 1,705 meters^2 (18,343 feet^2). Its design and features are based on the Remote Analytical Laboratory. The lower level would consist of three analytical cells and two gloveboxes, both warm and cold laboratory facilities, a shift office, a health physics office, personnel decontamination area, maintenance and other support facilities. The upper level would provide separate heating and air conditioning supply and exhaust area and electrical rooms.

The Environmental Analytical Laboratory would be a structural steel building with metal walls and roof panels. The building would have a rigid frame structure with horizontal bracing in the plane of the roof and vertical bracing in the side and end walls. The foundation would primarily consist of grade beams with spread footings at column locations. The analytical cells would have 1-meter (3.3-feet) thick concrete walls for shielding and they would be supported on an equally thick mat foundation. Other floor slabs would have a top elevation of 200 millimeters (8-inch) above grade elevation with footings down to the frostline. Reinforced concrete floor slabs would be sized to withstand the maximum loading, based on the design conditions.

The heating, ventilation, and air conditioning system would consist of multiple air-handling units that supply conditioned air to independent ventilation zones. The system would provide air for the clean areas, including cold laboratory, offices, and restrooms. Each ventilation zone in the clean area would be supplied by a single package heat pump unit. The areas of the facility having the potential for airborne contamination would be supplied by a once-through ventilation system. Those areas with high airborne contamination potential may receive ventilation air supply from other confinement zones, if this arrangement is beneficial. Airflow from these zones would be filtered and discharged through the stack with no recirculation.

Table C.6.2-26. Construction and operations project data for the New Analytical Laboratory (P18)

Table C.6.2-27. Decontamination and decommissioning project data for the New Analytical Laboratory (P18)

C.6.2.12 Remote Analytical Laboratory Operations (P18MC)

GENERAL PROJECT OBJECTIVES: This project is needed in conjunction with the other projects for the treatment and storage of high-level waste at INEEL. The project differs from another analytical laboratory project, P18, in that a new facility is not required. The existing analytical laboratory used in this project would continue to operation from 2007 through 2035, followed by decontamination, decommissioning, and demolition (covered in P159). No construction data is included, since the facility already exists.

PROJECT DESCRIPTION: Liquid waste samples from the Tank Farm and calcine samples from the NWCF processing facility would be taken and analyzed to determine the calcining process parameters, and to characterize the waste form for further treatment and disposal. The existing Remote Analytical Laboratory would continue to operate from 2007 through 2035.

Table C.6.2-28. Construction and operations project data for the Remote Analytical Laboratory Operations (P18MC)

C.6.2.13 Vitrified Product Interim Storage (P24)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide design, construction, startup, operation, and decommissioning of a facility to receive and store the waste filled glass canisters produced in the Full Separations and Planning Basis Options. The storage would be for an interim period of time until a repository is ready to receive the waste.

PROJECT DESCRIPTION: The scope of included work for this project is the effort to construct, operate, and decommission a facility to receive and store the waste-filled canisters produced in the Full Separations and Planning Basis Options. The vitrified waste would be placed in glass storage canisters that are qualified and approved for shipment to a repository. The canisters would be the same as those used at the Defense Waste Processing Facility at the Savannah River Site. The canisters would be loaded at the Vitrification Plant and sent directly to the Interim Storage Facility on a transfer cart through an underground transfer cart tunnel.

Three Interim Storage Facility concepts have been evaluated for the storage of the vitrified waste; the concepts include a new facility, a modified existing facility, or storage in NUHOMS™ storage casks.

NEW FACILITY DESCRIPTION: If a new Interim Storage Facility is built, it would be newly designed and constructed and sited adjacent to the Vitrified Product Process building. The Interim Storage Facility would consist of two equally sized, below-grade concrete vaults covered by a concrete operating deck. Each vault would contain 220 vertically oriented storage tubes with each tube holding two glass canisters. The storage tubes are closed and sealed by means of a shielding plug installed at the operating deck level. The storage vaults would have natural convective cooling with intake and exhaust plenums to maintain glass canister and structural materials within the allowable temperature limits. The glass canister handling machine would be used to handle the glass canisters. The handling machine would be designed to receive the glass canisters through the canister transfer tunnel and transport and place them in the storage tubes in the vaults.

MODIFIED EXISTING FACILITY: If it is decided to modify an existing building rather than build a new one, the modified Interim Storage Facility would be located in the building originally built to contain the Fuel Processing Restoration process. The Fuel Processing Restoration project was cancelled with the building mostly finished, but before most of the process equipment was installed. Internal specific areas of the building would have to be modified and/or finished to provide the modified Interim Storage Facility. These specific areas include electrical, heating, ventilation, and air conditioning, life safety systems, and the areas specific to the modified Interim Storage Facility. The major reason that the Fuel

Processing Restoration building was evaluated for the modified Interim Storage Facility are the existing concrete vaults that would have held the radioactive process equipment. If the modified Interim Storage Facility is selected, its current location would be an additional factor in the decision process to locate the process facility.

The modified Interim Storage Facility is designed to hold waste canisters in vertical sealed storage tubes. The storage tubes would be located in a concrete storage vault just as described for a new facility but would hold four canisters.

The concrete walls between the existing process vaults would be removed to form one storage vault. A steel grid arrangement would be installed on the existing concrete floor of the vault to level and position the storage tubes, and a steel lining would be installed on the east vault wall to provide the additional necessary personnel shielding. The bottoms of the storage tubes would be sealed with steel plate and the tops would be closed with steel shield plugs. Spacers would be used at the top of the pipes to position them and provide radiation shielding. The spacers and the pipes would be welded together to provide adequate air sealing so the fans can force the flow of cooling air from east to west. The combinations of spacers and pipe plugs would form a relatively flat floor.

A large open area called the charge hall is located above the top of the storage tube/shield plug/shield spacer surface and is formed by the walls and roof of the upper portion of the building. Two canister-handling machines used to move and handle the canisters are located in the charge hall.

NUHOMS™: If the NUHOMS™ system is used, the canisters would be placed into Dual Purpose Canisters and stored in NUHOMS™ storage casks on the existing ISFSI/NUHOMS™ pad. Additional pad space would have to be constructed adjacent to the existing pad.

Table C.6.2-29. Construction and operations project data for Vitrified Product Interim Storage (P24)

Table C.6.2-30. Decontamination and decommissioning project data for the Vitrified Product Interim Storage (P24)

C.6.2.14 Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository (P25A)

GENERAL PROJECT OBJECTIVE: The proposed project provides the support for the packaging and loading of vitrified high-activity waste that is stored in the Interim Storage Facility making it ready for shipment to a National Geological Repository. The sealed glass canisters would be loaded into a certified transport cask for shipment to the repository.

PROJECT DESCRIPTION: The packaging and loading project would remove all vitrified glass canisters produced in the Full Separations and Planning Basis options over 20 years beginning in year 2045. The canisters would be the same as those used at the Defense Waste Processing Facility at the Savannah River Site. With the radiation levels estimated to be 2500 R/hr at contact, all movements of the canisters from the storage tubes to the transport cask would be performed remotely by the same glass canister handling machine (GCHM) used for originally placing the canisters in the storage tubes. The transport would be a multi-purpose cask design modified and certified for this specific payload. The cask would accept four canisters in a specially designed basket with spacers. Once loaded the cask is prepared for transport (sealed with its bolted cover, inspected, and leak tested). The assembly would be moved out of the loading area into a staging area and made ready for shipment to the repository on its dedicated railcar.

FACILITY DESCRIPTION: The canister load out and railcar/transport cask assembly staging area is an integral part of the Interim Storage Facility located at the east side of the facility. It includes all the equipment, utilities and controls necessary to load canisters into a transport cask and make the cask ready for shipment.

An overhead bridge crane capable of handling the transport cask would run the length of the cells. A rail spur line, branching off from a line that services the steam plant, would slope down to the south end of the staging area where it enters the building through an overhead door. In the staging area the assembly would be cleaned and inspected and the impact limiters and the cask lid removed.

The railcar loaded with the transport cask would be moved into the load out area and positioned directly below an access port in the operating vault floor. The transport cask would be raised to an upright position for loading and back to the horizontal position while on the railcar. A platform capable of lifting the shipping cask and railcar assembly to receive the canisters from the handling machine would be provided. It would be equipped with restraints to prevent movement in the event of a seismic disturbance. The shielded cover of the access port would be opened directly over the transport cask basket allowing a canister to be loaded. Only one canister at a time can be loaded.

Table C.6.2-31. Construction and operations project data for the Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository (P25A)

Table C.6.2-32. Decontamination and decommissioning project data for the Packaging and Loading Vitrified HLW at INTEC for Shipment to a Geologic Repository (P25A).

This page intentionally left blank.

C.6.2.15 Class A Grout Disposal in Tank Farm and Bin Sets (P26)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide for the Resource Conservation Recovery Act (RCRA) performance-based clean closure of the Tank Farm Facility and the Calcined Solids Storage Facility (bin sets) and subsequent disposal of Class A grout in these facilities. The Tank Farm currently stores sodium-bearing liquid waste. The bin sets store calcined solids resulting from the calcination of liquid waste. Other projects would remove the liquid waste or calcine (except for the heel) from these facilities.

PROCESS DESCRIPTIONS: During the closure phase, the facilities would be decontaminated to the maximum extent that is technically and economically practical. For the Tank Farm, the tanks and vaults would be washed and the resulting liquid pumped out to remove the majority of the heel waste residues. The remaining liquid heel would be solidified using clean grout. The ancillary piping, such as waste transfer lines, would be flushed and grouted with clean grout. Afterwards, the vaults would be completely filled with clean grout to prevent the intrusion of liquid and to act as a temporary cover or cap over the tank. When pouring is complete, the 11 tanks and the sand under nine of the 11 tanks, would be encapsulated between the newly poured grout and the vault floor.

A similar closure approach would be used for the bin sets. The interior surfaces of the bins, piping, and ancillary equipment would be decontaminated, again to the maximum extent that is technically and economically practical. It is assumed, for this project, that the bins would be sufficiently decontaminated such that performance criteria would be met. The vault void (the space between the bins and the surrounding concrete structure) would be filled with clean grout to provide added structural rigidity to the bins and minimize the chance of subsidence within the bin sets over time.

After the Tank Farm and the bin sets have been closed, they would be used as low-activity waste disposal facilities. The tank and bin voids would be filled with Class A grout that would be produced at the Class A Grout Plant and delivered to the Tank Farm and bin sets in shielded piping.

FACILITY DESCRIPTIONS: The Tank Farm consists of underground storage tanks, tank vaults, interconnecting waste transfer lines, valve boxes, valves, airlift pits, cooling equipment, and several small buildings that contain instrumentation and valving for the waste tanks. The eleven 300,000 to 318,000-gallon stainless steel tanks are contained in underground, unlined concrete vaults and are used to store mixed liquid wastes. The tanks have a 50-foot diameter and an overall height of approximately 30 feet (including the dome height). A thin sand layer was placed between the vault floor and tank on nine of the eleven tanks.

Liquid waste is transferred throughout the Tank Farm in underground stainless steel lines. The liquid waste that remains after the tanks have been emptied as low as possible with the steam jets and airlifts is referred to as a “heel.” The heels are expected to range in volume from 5,000 to 15,000 gallons when cease use occurs. During high-level waste processing, grout would be pumped, at intervals, from the Class A Grout Plant to the Tank Farm in shielded lines.

The Calcined Solids Storage Facility contains seven bin sets, with each bin set containing multiple bins used for calcine storage. Each set of bins is arranged inside a concrete structure called a vault. The bins themselves are large vertical cylinders constructed of stainless steel. The Class A grout would be pumped to the bin sets using the same systems as in the Tank Farm.

Table C.6.2-33. Decontamination and decommissioning project data for Performance-Based Clean Closure of Bin Sets for the Class A Grout Disposal in Tank Farm and Bin Sets (P26 & P51)

Table C.6.2-34. Decontamination and decommissioning project data for Performance-Based Clean Closure of Tank Farm for the Class A Grout Disposal in Tank Farm and Bin Sets (P26 & P51)

Table C.6.2-35. Construction and operations project data for Bin Set Closure for the Class A Grout Disposal in Tank Farm and Bin Sets (P26)

Table C.6.2-36. Construction and operations project data for Tank Farm Closure for the Class A Grout Disposal in Tank Farm and Bin Sets (P26)

Table C.6.2-37. Decontamination and decommissioning project data for Tank Farm Closure with Class A Fill for the Class A Grout Disposal in Tank Farm and Bin Sets (P26)

Table C.6.2-38. Decontamination and decommissioning project data for Bin Sets Closure with Class A Fill for the Class A Grout Disposal in Tank Farm and Bin Sets (P26)

C.6.2.16 Class A/C Grout Disposal in a New Low-Activity Waste Disposal Facility (P27)

GENERAL PROJECT OBJECTIVE: This project presents a proposed design for the Idaho National Engineering and Environmental Laboratory (INEEL) Low-activity Waste Class A/C Near Surface Land Disposal Facility. The INEEL low-activity waste disposal facility project provides an “assured storage management system” for the near surface disposal of Class A or C waste.

PROJECT DESCRIPTION: The primary design criterion is to prevent leaching of contaminants from the waste into the surrounding soil or into the Snake River Aquifer. The project provides a modular design in which reasonably sized durable containers can be stored. The containers in which the grouted waste would be placed are of a size that could be retrieved and moved or repaired in the event of an unforeseen problem. The containers were also designed such that they would neither corrode nor decompose in a manner that structural integrity is lost. This provides a design that is termed “Assured Storage.” The INEEL Disposal Facility would be an engineered watertight structure with a load bearing cap and internal structure.

FACILITY DESCRIPTION: This structure is designed for the long-term disposal of a maximum of 34,830 m^3 (45,556 yd^3) of Class A/C radioactive grouted LLW. The disposal unit would be constructed of reinforced concrete with liquid-tight coated interior walls and floors providing primary containment. The unit would be partitioned into nine separate cells by 45.72-cm (18-in.) reinforced concrete load-bearing walls. The drainage system design is provided by sloping the floors in the disposal unit to trench drains in the center of each cell. A secondary containment is included in the design consisting of a reinforced, heat-welded thermoplastic geo-liner set on a compacted sub-base. The geo-liner would extend under the foundation and around the walls of the disposal facility.

The most cost-effective site for the low-activity waste disposal facility and support facilities would be generally located outside the southeast corner of and as near as possible to the INTEC security perimeter fence. This location is desirable since it has already been disturbed by activities at the INTEC and many personnel facilities are already in place at the INTEC. Additionally, the roads leading from the INTEC to the disposal site are private INEEL roads

The facility design has both an internal and an external monitoring capability for the duration of institutional control of the facility. The facility is also designed so that if radioactive material is discovered to have leached from within the facility, then the site can be remediated and repaired quickly and in a cost-effective manner.

A soil cap would be placed over the disposal unit roof after a concrete protective wear surface has been cast. The cap would include both backfilled soil and topsoil and would be at least 2.13 m (7 feet) deep to support growth of selected indigenous plant materials. The cap would be seeded with indigenous plant materials that would best transpire moisture from the soil to the atmosphere in the semi-arid alpine desert area of the INEEL.

The effective life of the disposal facility disposal unit as an intruder barrier and hazard protection would not be less than 500 years or until the maximum remaining radioactivity from all wastes would not pose an unacceptable hazard to an intruder or public health and safety. Institutional control of the site would be maintained at least through the year 2095.

Table C.6.2-39. Construction and operations project data for the Class A/C Grout Disposal in a New Low-Activity Waste Disposal Facility (P27)

Table C.6.2-40. Decontamination and decommissioning project data for the Class A/C Grout Disposal in a New Low-Activity Waste Disposal Facility (P27)

C.6.2.17 Class A Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility (P35D)

GENERAL PROJECT OBJECTIVE: The project objective is to provide for the design, construction, operation, and decommissioning of a facility to fill and seal landfill-disposable hollow concrete cylinders with Class A low-level waste (LLW) grout, load the containers onto a lowboy trailer and ship to an INEEL disposal facility.

PROCESS DESCRIPTION: This process consists of pumping the Class A LLW grout into hollow concrete cylinders, sealing the cylinders and transporting them to a disposal facility southeast of the INTEC. The grout would be pumped from the Class A Grout Plant as it is produced. A total of 22,339 cylinders would be filled, sealed and transported to the disposal facility. A lowboy trailer with tractor, carrying 6 cylinders per load is proposed to accomplish the transfer. The grouted concrete cylinders would be 20 mR/hr or less at contact. The cylinders could therefore be contact handled.

The steps involved in performing the operations necessary to transport the grouted cylinder to the disposal facility would be: filling, sealing the cylinders, performing a contamination and radiation survey of the cylinders, moving the cylinders from the fill area to the load area, load the cylinders and transport the cylinders to the disposal facility, unload the cylinders and return. A portable crane would be provided at the disposal facility to unload the cylinders.

FACILITY DESCRIPTION: The Grout Packaging Facility would be located in the south end of the Class A Grout Plant. The Grout Plant would be located approximately 130 feet to the west and slightly to the north of the Waste Separations Facility, which would be located near the northeast corner of the INTEC. This would include a station where the hollow concrete cylinders would be filled, sealed, and stored awaiting transportation. A hatchway in the main floor, with a 40-ton overhead bridge crane would allow for removal and installation of equipment as well as handling the empty and filled concrete waste cylinders.

The filling, sealing, handling and removal equipment would be located on the basement level. The container filling station and the container sealing station would be located on the east side of the enclosure. A grout supply line from the Class A Grout Plant with necessary grout flow controls would enter the container fill station on the east side. The sealing station would be located to the north of the fill station and also on the east side of the filling, sealing and handling enclosure. There would also be available floor space near the filling and sealing stations to store several empty cylinders and several cylinders that have been filled but not sealed. Storage space for filled and sealed cylinders would be provided on the west side of the enclosure with storage space for 36 cylinders.

An overhead rollup door located at the south end of the facility would provide access into the main floor level. This would allow lowboy access into the main floor area for loading the grouted concrete cylinders.

Table C.6.2-41. Construction and operations project data for the Class A Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility (P35D).

Table C.6.2-42. Decontamination and decommissioning project data for the Class A Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility (P35D).

C.6.2.18 Class A Grout Packaging and Loading for Offsite Disposal (P35E)

GENERAL PROJECT OBJECTIVE: The project objective is to provide for the design, construction, operation, and decommissioning of a facility to fill and seal landfill-disposable hollow concrete cylinders with Class A low-level waste (LLW) grout and load them onto rail cars for offsite disposal.

PROCESS DESCRIPTION: This process consists of pumping the Class A LLW grout into hollow concrete cylinders, sealing the cylinders and loading them onto rail cars for offsite disposal. The grout would be pumped from the Class A Grout Plant as it is produced. A total of 22,100 cylinders are to be filled, sealed and loaded for offsite disposal. The grouted concrete cylinders would read 20 mR/hr or less at contact and therefore can be contact handled.

The steps involved in performing the operations necessary to package and load the grouted cylinders for offsite disposal are: filling and sealing the cylinders, performing a contamination and radiation survey of the cylinders, moving the cylinders from the fill area to the load area, and loading the cylinders onto rail cars for offsite disposal.

FACILITY DESCRIPTION: The Grout Packaging Facility would be located in the south end of the Class A Grout Plant. The Class A Grout Plant would be located approximately 130 feet to the west and slightly to the north of the Waste Separations Facility, which would be located near the northeast corner of the INTEC. This would include a station where the hollow concrete cylinders would be filled, sealed, and stored near term prior to loading for offsite disposal. A hatchway in the main floor, with a 40-ton overhead bridge crane, would allow for removal and installation of equipment as well as handling the empty and filled concrete waste cylinders.

The filling, sealing, handling and removal equipment would be located on the basement level. The container filling station and the container sealing station would be located on the east side of the enclosure. A grout supply line from the Class A Grout Plant with necessary grout flow controls would enter the container fill station on the east side. The sealing station would be located to the north of the fill station and also on the east side of the filling, sealing and handling enclosure. There would also be available floor space near the filling and sealing stations to store several empty cylinders and several cylinders that have been filled but not sealed. Storage space for filled and sealed cylinders would be provided on the west side of the enclosure with storage space for approximately 36 cylinders. Space would also be provided for transporting the cylinders from the basement area to the main floor, i.e. the floor area directly beneath the overhead hatch would be clear.

An overhead rollup door located at the south end of the Grout Packaging Facility would provide access into the main floor level. This would allow transporter access into the main floor area for loading the grouted concrete cylinders. Due to its low specific activity (LSA) and low radiation field, the grouted concrete disposal cylinders would also serve as the shipping containers.

Table C.6.2-43. Construction and operations project data for the Class A Grout Packaging and Loading for Offsite Disposal (P35E)

Table C.6.2-44. Decontamination and decommissioning project data for the Class A Grout Packaging and Loading for Offsite Disposal (P35E).

C.6.2.19 Packaging and Loading Transuranic Waste at INTEC for Shipment to the Waste Isolation Pilot Plant (P39A)

GENERAL PROJECT OBJECTIVES: The proposed project encompasses the handling and loading of transport casks with remote-handled Waste Isolation Pilot Plant (RH-WIPP) type half-canisters containing transuranic waste before immediate transport to WIPP for disposal. Truck transport is assumed with transport casks modeled after an existing spent fuel transport cask. The handling and loading of casks and canisters would occur in the Waste Separations Facility. The RH-WIPP half-canisters would be ready for shipment; therefore, there would be no waste packaging issues relative to this project. Handling and loading of casks would occur over a 21-year period but would not start before WIPP was opened to accept TRU waste. Loaded cask transport from the INEEL to WIPP, subsequent handling at WIPP, and empty cask return to the INEEL are not part of this project.

PROJECT DESCRIPTION: Approximately 550 RH-WIPP half-canisters would be produced over a 22-year timeframe and shipped directly to WIPP for disposal.

All shipments to WIPP would require the use of a Type-B (M), Fissile Class 1, shielded ground shipping package (cask). The shipping cask designated for use by this project would be the RH-TRU 72-B, developed for RH-WIPP half-canister transport. One cask would be carried on a trailer for truck transport to WIPP. The cask has been tested and licensed by the NRC for TRU waste ground shipment. Each shipping cask would be capable of transporting one RH-WIPP half-canister; however, the containerized waste would require NRC approval as an authorized cask content prior to any shipment.

Table C.6.2-45. Construction and operations project data for Packaging and Loading of Transuranic Waste at INTEC for Shipment to the Waste Isolation Pilot Plant (P39A)

Table C.6.2-46. Decontamination and decommissioning project data for the Packaging and Loading of Transuranic Waste at INTEC for Shipment to the Waste Isolation Pilot Plant (P39A)

This page intentionally left blank.

C.6.2.20 Transuranic/Class C Separations (P49A)

OVERVIEW: This project describes the costs and impacts of the Transuranic Separations Facility and some smaller, related facilities. These related facilities include the Bulk Chemical Storage Facility, Condensate Collection Facility, and the Low Activity Waste Collection Facility. The Transuranic Separations Facility receives liquid sodium-bearing waste from the Tank Farm Facility and solid calcine from the Calcined Solids Storage Facility. After some initial treatment of these feed streams, the radionuclides are chemically separated into two streams, one containing the transuranic nuclides and a second waste stream containing the rest of the nuclides (including cesium and strontium). The transuranic stream is dried to a solid form that would be shipped to the Waste Isolation Pilot Plant. The other stream is routed to other facilities (addressed as separate projects) for further treatment.

GENERAL PROJECT OBJECTIVES: The project described in this Project Summary is part of the Transuranic Separations Option. The Transuranic Separations Option involves the processing of the liquid sodium-bearing waste and solid calcine that is currently stored at the INTEC. This project addresses the Transuranic Separations Facility and related facilities.

PROCESS DESCRIPTION: The Transuranic Separations Facility receives liquid sodium-bearing waste from the Tank Farm and solid calcine from the Calcined Solids Storage Facility (CSSF or bin sets). After some initial treatment of these feed streams, the radionuclides would be chemically separated into two streams, one containing the transuranic nuclides and another low activity waste stream containing the rest of the nuclides. The transuranic stream would be dried to a solid form to be shipped to the Waste Isolation Pilot Plant. The low-activity waste stream is routed to another facility (addressed as a separate project) for further treatment.

Sodium-bearing waste (SBW) is transferred from the Tank Farm to a day storage tank in the Transuranic Separations Facility. The equipment for retrieval of this stream is included in this project. The SBW would then be filtered to remove undissolved solid particles before further processing. Calcine retrieval from the bin sets is addressed as a separate project. This project starts with receipt of the calcine at the Transuranic Separations Facility and includes the equipment (filters, storage bins, etc.) necessary. After the calcine is received at the Transuranic Separations Facility, it would be dissolved in nitric acid and filtered, in preparation for further processing.

After filtration of either SBW or dissolved calcine, the waste would be sent to the transuranic extraction process.

Transuranic Extraction is a solvent extraction process that removes dissolved actinides from a liquid. The organic solvent extracts a high percentage of actinides from the aqueous feed and also extracts a portion of other radioactive and nonradioactive ions. To minimize the partitioning of these non-actinide species into the solvent, the solvent would be "scrubbed" with a weak nitric acid solution that back-extracts most of the non-actinide species into the scrub effluent, which is combined with the feed. The solvent would then be "stripped" of actinides by contacting it with a weak nitric acid solution containing 1-hydroxyethane 1,1 diphosphonic acid. The strip solution would remove the actinides and a few other metal ions such as molybdenum and zirconium. The solvent would then be contacted with an aqueous sodium carbonate solution to remove additional ions, primarily mercury. Contact with the carbonate solution also neutralizes acid present in the solvent and removes organic degradation products. Finally the solvent would be contacted with weak nitric acid to re-acidify the solution, which is then recycled back to the front end of the transuranic extraction process.

Mixing and separation of the various solutions in the transuranic extraction process would take place in a series of centrifugal contactors. The centrifugal contactors would provide high aqueous organic interface to promote mixing and then accomplish quick separation between the organic and aqueous phases to minimize degradation of the organic solvent.

A portion of the carbonate wash solution would be sent to a mercury removal system, in which dissolved mercury in the waste would be reduced to elemental mercury using formic acid. The metallic mercury would then be amalgamated and packaged for storage and disposal.

The transuranic bearing stream would be concentrated in an evaporator and transferred to a drier where it would be dried to a powder-like form. This remote-handled transuranic powder would be packaged and sealed in WIPP half-canisters for disposal at the Waste Isolation Pilot Plant.

The non-transuranic bearing stream would be transferred to another facility for additional processing.

FACILITY DESCRIPTIONS: This project addresses the Transuranic Separation Facility and related facilities. The other facilities associated with this project are the:

- Bulk Chemical Storage Facility, a steel-framed structure that would be used for storage of non-radioactive bulk chemicals needed for processing.

- Low Activity Waste Collection Facility, a concrete shielded structure containing tanks that would collect low activity waste from various locations on the INTEC. This facility would be a 21.1-meters

(69-feet) by 12.9-meters (42-feet) long concrete structure that houses the three collection tanks. Each collection tank has a 303-cubic meter capacity (80,000 gallons). The three tanks are located on one side of the facility behind a shield wall. The pumps used to transfer the liquids to the Transuranic Separations Facility would be located on the other side of the wall. This would reduce radiation exposures when maintenance of the pumps is required.

- Condensate Collection Facility, a steel-framed structure housing tanks that would collect condensed steam (non-radioactive) from various process and building users before transfer back to the steam plant. This facility would be a 21.1-meters (69-feet) by 12.9-meters (42-feet) structural steel building with a reinforced concrete slab floor. It houses the two 150-cubic meter (40,000 gallons) tanks that would be used to collect condensed steam from the various process heaters before transferring it back to the steam plant.

The overall dimensions of the Transuranic Separation Facility would be 101 meters (332 feet) by 55.8 meters (183 feet). It would extend 15.5 meters (51 feet) below grade and 13.5 meters (44 feet) above grade. The Transuranic Separation Facility is designed to house the equipment and systems for receiving both the SBW and calcine feed materials and separating them into the transuranic and low-activity waste streams. It would be based on a concept of centrally located, below grade, process cells with thick concrete walls surrounded by areas that contain progressively less radioactive hazards. Equipment that would be in highly radioactive service and not expected to require maintenance (e.g., tanks) would be located in the central cells. Equipment in radioactive service that would require maintenance would be located in corridors (pump and valve corridors) that are adjacent to the process cells. Finally, personnel access corridors would be located outside the pump and valve corridors and allow visual access to the pump and valve corridors via shielded windows. Stainless steel liners would be provided in areas where equipment and valves create a need for spill protection and decontamination.

In addition to the cells housing the process equipment, there would be three additional cells located at the north end of the facility. These cells would be the manipulator repair cell, for repair of manipulators and other equipment, a decontamination cell, for decontamination of equipment prior to maintenance activities, and a filter leach cell, in which process filters are treated (by leaching in nitric acid) to remove much of the contamination before they are disposed of. Administrative areas, the control room, and cold chemical make up areas would be located on the main floor (elevation 1.5 meters).

As in any nuclear facility, the Transuranic Separation Facility would be divided into ventilation zones depending on the potential for contamination. Pressure differentials would be maintained so that air flows from areas of lowest contamination potential to areas of highest contamination potential. The areas of highest potential for contamination would be maintained at the lowest pressure (typically -0.75 inch of water). Administrative areas with no contamination potential (designated clean areas) would be ventilated using separate systems designed to commercial standards.

Table C.6.2-47. Construction and operations project data for the Transuranic/Class C Waste Separations (P49A).

Table C.6.2-48. Decontamination and decommissioning project data for the Transuranic/Class C Separations (P49A).

This page intentionally left blank.

C.6.2.21 Class C Grout Plant (P49C)

GENERAL PROJECT OBJECTIVES: This project is related to the Separations Alternative and describes the costs and impacts of one of the facilities supporting that alternative, the Class C Grout Plant, designated the Low Activity Waste Treatment Facility.

PROCESS DESCRIPTION: The Class C Grout Plant would receive concentrated low-activity waste from another facility, the Transuranic Separations Facility. This low-activity waste would be the product of a process that chemically separates various radionuclides from the liquid sodium-bearing waste and granular solid calcined material that is currently stored at INTEC. After the transuranic nuclides have been removed from the SBW and dissolved calcine, the solution containing the remaining radionuclides would be concentrated in an evaporator and transferred to the Class C Grout Plant. The concentrated stream is subjected to a high temperature denitration process. The denitration would be accomplished in a fluidized bed that uses air as the fluidization gas and burns kerosene with oxygen to provide the reaction temperature. The nitrates in the concentrated liquid stream are evolved as nitrogen oxides. Offgas from the denitrator would be treated to reduce emissions of unburned hydrocarbons and nitrogen oxides to acceptable levels. Solids from the denitrator would be pneumatically conveyed to a storage bin. At intervals (currently assumed to be about once per month) the solids would be combined with Portland cement, blast furnace slag and flyash to form a grout. Based on the concentrations of nuclides in this mixture, the grout is expected to meet the definition of Class C LLW, as given in 10 CFR 61. These projects end with the grout ready to be pumped (pump included with this project) to disposal facilities or LLW containers. The packaging for disposal and disposal facilities are addressed in other projects.

FACILITY DESCRIPTIONS: The Class C Grout Plant is about 57-m (187-ft) long (north-south) and about 43-m (144-ft) wide (east-west). It would extend about 22-m (72-ft) above grade and about 12-m (40-ft) below grade. The areas that contain radioactive material would be generally located below grade, in a central concrete core. Hatches in the tops of the cells would be provided for initial installation of this equipment and non-routine access later. The cell floors and walls would be lined with stainless steel to allow easy decontamination. The process areas would be located on the lower level, and consist of a number of cells that contain the waste feed storage tanks, the denitrator, offgas treatment equipment, solids separation and storage equipment, and grout mixing and pumping equipment. A decontamination cell would also be located on the lower level and provides an area where equipment can be decontaminated before hands-on maintenance is performed.

As in any nuclear facility, the Class C Grout Plant would be divided into ventilation zones depending on the potential for contamination. Pressure differentials would be maintained so that air flows from areas of lowest contamination potential to areas of highest contamination potential. The areas of highest potential for contamination would be maintained at the lowest pressure (typically -0.75 in. of water). Administrative areas with no contamination potential (designated clean areas) would be ventilated using separate systems designed to commercial standards.

Table C.6.2-49. Construction and operations project data for the Class C Grout Plant (P49C)

Table C.6.2-50. Decontamination and decommissioning project data for the Class C Grout Plant (P49C)

This page intentionally left blank.

C.6.2.22 Class C Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility (P49D)

GENERAL PROJECT OBJECTIVES: This project would provide a facility and process for packaging, loading, and shipping to INEEL disposal facility the Class C low-level radioactive waste (LLW) grout resulting from the Transuranic (TRU) Separations process.

PROJECT DESCRIPTION: Low activity waste, from the transuranic separation process, would be denitrated and combined with cement and other additives in the Class C Grout Plant, resulting in a Class C grout. The Class C grout would be pumped to the Container Filling, Storage and Shipping Area of the project. Because of the presence of the cesium and strontium in this stream, this grout would be much more radioactive than the Class A grout produced under the Full Separations Option and requires additional shielding and remote handling. Concrete landfill containers would be remotely filled with the grout and the grout is allowed to solidify. The containers would be capped, loaded into a shielded cask, transported to an INEEL landfill disposal facility and placed into the disposal facility.

NEW FACILITY DESCRIPTION: The Class C grout Container Filling, Storage and Shipping Area would be a new design and construction project and would be sited contiguous to or adjacent to the Class C Grout Plant. Concrete landfill containers, with a capacity of about 1 m^3 would be filled with the grout within the facility and allowed to set. Then a cap would be placed on the container and it would be surveyed and decontaminated, or covered with a coating to fix the contamination. The finished containers would be loaded into a shielded cask, transported to an INEEL landfill disposal facility and placed into the disposal facility.

The Container Filling, Storage and Shipping Area would be designed with enough space to hold 72 concrete waste containers in temporary (surge) storage. The container loading area would be located in a cell below grade. A hatch in the top of the cell would be provided for initial installation of equipment and routine access for transfer of empty and loaded waste containers and transport casks. One-meter thick concrete walls would separate the process cell and corridors to shield personnel from radiation. The Class C grout could have radiation fields as high as 123 R/hr. The cell floor and walls would be lined with stainless steel to allow easy decontamination.

The Container Filling, Storage and Shipping Area would handle 21,100 landfill disposal containers over the 22-year operating period. Type B shielded casks would be used to transport the containers to an INEEL disposal area. It is estimated that 16 of the casks would be required.

Table C.6.2-51. Construction and operations project data for the Class C Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility (P49D).

Table C.6.2-52. Decontamination and decommissioning project data for the Class C Grout Packaging and Shipping to a New Low-Activity Waste Disposal Facility (P49D).

This page intentionally left blank.

C.6.2.23 Class C Grout Disposal in Tank Farm and Bin Sets (P51)

GENERAL PROJECT OBJECTIVE: The Tank Farm currently stores sodium-bearing liquid waste (SBW). The Calcined Solids Storage Facility (CSSF or bin sets) stores high-level waste (HLW) calcined solids resulting from the calcination of liquid waste. Other projects would remove the liquid waste or calcine (except for the heel) from these facilities. This project would provide for the Resource Conservation Recovery Act (RCRA) Performance-Based Clean Closure of the Tank Farm and bin sets and subsequent disposal of Class C Low-Level Waste (LLW) grout in these facilities. RCRA would no longer regulate either facility once the performance-based closure has been achieved. This would allow other uses for the remaining void spaces.

This project assumes that the facilities would be decontaminated to the maximum extent that is technically and economically practical. It is further assumed that the residual levels of contamination would meet the performance requirements for performance-based closure under RCRA. Meeting the performance criteria means:

- The waste has been removed from the tank system, and
- The contamination remaining in a tank or bin is within an acceptable risk level to the public or environment and is consistent with the remediation goals for the INTEC.

After the facilities are closed, they would then be used as LLW disposal facilities to receive the LLW grout generated by the Separations process.

FACILITY DESCRIPTIONS: The Tank Farm consists of underground storage tanks, tank vaults, interconnecting waste transfer lines, valve boxes, valves, airlift pits, cooling equipment, and several small buildings that contain instrumentation and valving for the waste tanks. The eleven stainless steel 300,000- to 318,000-gallon tanks (hereafter referred to as 300,000-gallon tanks) are contained in underground, unlined concrete vaults. The tanks have a 50-foot diameter and an overall height of approximately 30 feet (includes the dome height). The vault floors are approximately 45 feet below grade level and are patterned after three basic designs: cast-in-place octagonal vaults, pillar-and-panel style octagonal vaults, or cast-in-place square 4-pack configuration. A thin sand layer was placed between the vault floor and tank on nine of the eleven tanks. To protect personnel from radiation, the concrete vault roofs are covered with approximately 10 feet of soil.

The 300,000-gallon tanks are used to store mixed liquid wastes. Eight of the eleven 300,000-gallon tanks contain stainless steel cooling coils, which are located on the tank walls and floors. These cooling coils were used, as required, to maintain the liquid waste below predetermined temperatures in order to minimize corrosion of the stainless steel tanks.

Liquid waste is transferred throughout the Tank Farm in underground, stainless steel lines. The stainless steel lines are housed in stainless steel-lined concrete troughs or double-walled stainless steel pipe. The waste is transferred using steam jets or airlifts. Generally, the intakes are located 4 to 12 inches above the tank floor, which limits the amount of liquid waste that can be removed from the tanks. The liquid waste that remains after the tanks have been emptied as low as possible with the steam jets and airlifts is referred to as a "heel." The heels are expected to range in volume from 5,000 to 15,000 gallons when cease use occurs.

The systems used for closure would involve remotely operated equipment to wash down the tanks, remove the heel to the extent possible, solidify the remaining heel, and fill the vault with clean grout. During the processing of the HLW in the Class C Grout Plant, grout would be pumped, at intervals, from the Grout Plant to the Tank Farm in shielded lines.

The Calcined Solids Storage Facilities contain seven bin sets, with each bin set containing multiple bins used for calcine storage. Each set of bins is arranged inside a concrete structure called a vault. The bins themselves are large vertical cylinders constructed of stainless steel. Bin set 1, the first constructed, is much smaller than the other six. In bin set 1, the bins vary in diameter from 3 feet to 12 feet, and in length from 20 feet to 24 feet. The bins in the rest of the bin sets are 12 feet to 13.5 feet in diameter and from 40 feet to almost 70 feet in length. The bins (with the exception of those in bin set 1) are equipped with retrieval risers or pipes that connect to the surface. These risers would be used during calcine retrieval operations. New risers would be installed on the bins in bin set 1 during the calcine retrieval activities. The vaults for bin sets 2 through 7 are hollow cylinders, with inside diameters of 40 feet to 60 feet, and a wall thickness of 2 feet to 4 feet. The vault for bin set 1 is a square design, with walls about 2.5 feet thick.

The systems used for closure of the bin sets would include remotely operated drilling and cutting equipment, remotely operated carbon dioxide pellet blasting systems, remotely operated robots for cleaning the interior surfaces of the bins, and equipment for filling the lines and vaults with clean grout.

The Class C grout would be pumped to the bin sets using the same systems as in the Tank Farm.

PROCESS DESCRIPTION: The processes considered in this project are best described in two phases: (1) closure of the facilities as required for a RCRA interim status facility, and (2) subsequent use of the remaining tank and bin voids as a grout landfill.

RCRA PERFORMANCE-BASED CLOSURE: During the closure phase, the facilities would be decontaminated to the maximum extent that is technically and economically practical. For the Tank Farm, the tanks and vaults would be washed and the resulting liquid pumped out to remove the majority of the heel waste residues. The remaining liquid heel would be solidified using clean grout. The ancillary piping, such as waste transfer lines, would be flushed and grouted with clean grout. Tank leak monitoring lances would then be installed in four equally spaced locations inside the vaults. Afterwards, the vaults would be completely filled with clean grout to prevent the intrusion of liquid and to act as a temporary cover or cap over the tank. When pouring is complete, the 11 tanks, and the sand under nine of the 11 tanks, would be encapsulated between the newly poured grout and the vault floor.

A similar closure approach is proposed for the bin sets. The interior surfaces of the bins, piping, and ancillary equipment would be decontaminated, again to the maximum extent that is technically and economically practical. It is proposed that decontamination be accomplished by blasting the contaminated surfaces with carbon dioxide pellets to minimize the generation of any secondary waste and maintain the structural integrity of the bins. This blasting process would dislodge the residual calcine remaining on the bin walls and floors. This dislodged calcine would then be removed from the bins using robots and the calcine removal equipment previously installed to remove the calcine.

It is assumed, for this project, that the bins would be sufficiently decontaminated such that performance criteria would be met. The vault void (the space between the bins and the surrounding concrete structure) would be filled with clean grout to provide added structural rigidity to the bins and minimize the chance of subsidence within the bin sets over time.

SUBSEQUENT USE: After the Tank Farm and the bin sets have been closed, they would be used as LLW grout landfills. The tank and bin voids would be filled with Class C grout that would be produced at the Grout Plant and delivered to the Tank Farm and bin sets in shielded piping.

Table C.6.2-53. Decontamination and decommissioning project data for Performance-Based Clean Closure of the Bin Sets for the Class C Grout Disposal in Tank Farm and Bin Sets (P51 & P26).

Table C.6.2-54. Decontamination and decommissioning project data for the Performance-Based Clean Closure of the Tank Farm for the Class C Grout Disposal in Tank Farm and Bin Sets (P51 & P26).

Table C.6.2-55. Construction and operations project data for Bin Set Closure for the Class C Grout Disposal in Tank Farm and Bin Sets (P51).

Table C.6.2-56. Decontamination and decommissioning project data for Bin Set Closure for the Class C Grout Disposal in Tank Farm and Bin Sets (P51).

Table C.6.2-57. Construction and operations project data for Tank Farm Closure for the Class C Grout Disposal in Tank Farm and Bin Sets (P51).

Table C.6.2-58. Decontamination and decommissioning project data for Tank Farm Closure for the Class C Grout Disposal in Tank Farm and Bin Sets (P51).

This page intentionally left blank.

C.6.2.24 Calcine Retrieval and Transport (P59A)

GENERAL PROJECT OBJECTIVE: The general objectives of the proposed calcine retrieval and transportation project at the INTEC are to prepare the bin sets for retrieval of the calcine, retrieve the calcine from the bin sets, and transport the retrieved calcine to the waste processing facility for processing. Each of these objectives are necessary for all waste processing alternatives except for the No Action and Continued Current Operations Alternatives.

PROJECT DESCRIPTION: The complete calcine retrieval and transportation system would be discussed in three sections: bin set access, calcine retrieval, and calcine transportation.

BIN SET ACCESS: Bin set access activities prepare the bin sets for retrieval of the calcine. A confinement enclosure and Ventilation Instrumentation and Control building would be constructed for each bin set. A confinement enclosure, located on top of each bin set, would provide secondary confinement for bin set access and calcine retrieval activities. These enclosures would be prefabricated metal buildings with the surfaces of the enclosure coated with a strippable coating. A Ventilation Instrumentation and Control building would be located adjacent to each bin set, housing ventilation equipment for one bin set and its associated confinement enclosure. Additionally, the instrumentation for the bin set and retrieval system would be located inside the Ventilation Instrumentation and Control building. The retrieval and transportation system would be operated from the Ventilation Instrumentation and Control building.

Once the confinement enclosure and Ventilation Instrumentation and Control buildings are constructed, decontamination of the vaults, cells, and rooms located above the bin storage vault (also known as the superstructure of the bin set). The ventilation, instrumentation, and operational (including the cyclone) equipment housed inside these vaults would be removed. Piping that enters the superstructure through the walls, roof, or floor would be cut at the point of entry and capped. These lines would be decontaminated during bin set closure activities after the retrievable calcine has been removed from a bin set. Piping that lead away from the bin set (such as calcine transport lines used to deliver the calcine to the bin sets) would be decontaminated at the time they are cut.

The superstructures of bin sets 1, 2, 3, and 4 would be demolished after the equipment and piping has been removed in order to provide a flat surface for retrieval activities. A thick concrete pad would be poured on top of the bin storage vaults for bin sets 1-4. The pad would provide additional shielding during retrieval activities. Access to the capped piping would be provided. Bin sets 5, 6, and 7 would not require the demolition of the superstructure or installation of a concrete pad. The design of these bin sets allows a confinement enclosure to be built on the roof. The superstructure would provide the necessary shielding.

Existing retrieval risers would be accessed where available. However, retrieval risers must be remotely installed in bin sets 1, 2, and 3. A remote drilling platform would be used to drill through the concrete floor of the confinement enclosure on those bin sets and a resistance type welder would be used to install a stem to the top of each bin. Each bin in bin set 1 and the center bin in bin set 2 require two retrieval risers to be installed. One retrieval riser must be installed for the remaining bins in bin set 2 and all the bins in bin set 3. The bins would be entered by remotely cutting a hole through the top of the bins but inside the newly installed retrieval risers. The retrieval risers would be capped with removable, stepped, concrete plugs.

At the end of these activities, the bin sets are ready for retrieval of the calcine.

CALCINE RETRIEVAL: The calcine retrieval and transportation occur simultaneously as a result of an integrated system. Two calcine retrieval and transportation systems would be installed. This would allow calcine from two bins within two separate bin sets to be retrieved at any given time. The various calcines can be blended to optimize the waste process, which results in minimizing the waste product volume. Each system would deliver 2700 kg/hr of calcine to the waste processing facility.

Calcine would be remotely retrieved from the storage bin by two retrieval lines. The retrieval lines are sized to fit inside the retrieval risers that extend from the top of the bins to the floor of the confinement enclosure. An air jet would fluidize the calcine and a suction nozzle would remove it from the bin and place it in the transport system. It is assumed (based upon testing of bin set stored calcine and pilot plant produced calcine) that the calcine would not be significantly agglomerated, thus allowing the air jet to fluidize it.

In pilot plant studies, this retrieval method could efficiently remove 95% of the simulated calcine from a bin. The retrieval lines are disconnected from the system and remain in the bin after 95% of the calcine has been retrieved. The retrieval lines are thus available for later retrieval of the final 5% of the calcine.

CALCINE TRANSPORTATION: Currently, calcine is transported from the New Waste Calcining Facility to bin set 6 in a vacuum transport system. This method of calcine transport has proven to be reliable and safe. In industry, this type of transport system is generally accepted to have a limited transport distance of 250 feet to 300 feet. The optimum location for the waste processing facility is within this boundary.

The transport air blower would provide the suction to retrieve calcine from the bin sets and transport it to the waste processing facility. The exhaust air from the blower would be returned to the bin set and acts as the air jet to fluidize the calcine. Each transport system would have a back up transport pipe in case the transport line becomes plugged. The air lines would be heat traced to prevent water vapor from condensing and freezing inside. A concrete pipe chase would encase the transport lines, air lines, and heat tracing and would be covered by an earthen berm. The transport line pipe chase would run above grade.

The transportation system equipment would be housed in the waste processing facility. Each of the two transport systems would have a transport air blower, cyclone, sintered metal filter (or equivalent), high-efficiency particulate air (HEPA) filter bank, and a balancing air blower. The transport air blower would provide motive force for calcine retrieval and transport. The cyclone and sintered metal filter would separate the calcine from the transport air. The HEPA filter bank would remove 99.97% of the calcine remaining in the transport air before it enters the transport air blower. The balancing air blower would exhaust 10% of the transport air to the waste processing facility offgas system. The remaining 90% of the transport air would be recycled to the bin set to be used as the air jet.

If the waste processing facility were located outside the accepted range of a vacuum transport system, an intermediate transport station located midway between the bin sets and the waste processing facility would be required. The calcine would be delivered to the intermediate transport station as if it were at the waste processing facility. The calcine would be separated from the transport air and placed in a receiving bin. The transport air from the first leg of the system is filtered and recycled back to the bin set. A rotary valve would fluidize the calcine as it enters the second leg of the transport system. The calcine would be transported to the waste processing facility by the second leg of the transport system. Again the calcine would be separated from the transport air. The transport air would be recycled back to the intermediate transport system. The calcine would be gravity fed to the waste treatment process.

Table C.6.2-59. Construction and operations project data for the Calcine Retrieval and Transport (P59A).

Table C.6.2-60. Decontamination and decommissioning project data for the Calcine Retrieval and Transport (P59A).

C.6.2.25 Calcine Retrieval and Transport Just-in-Time (P59B)

GENERAL PROJECT OBJECTIVE: The general objectives of the proposed calcine retrieval and transportation project at INTEC are to prepare the bin sets for retrieval of the calcine, retrieve the calcine from the bin sets, and transport the retrieved calcine to a treatment facility for processing.

PROCESS DESCRIPTION: The calcined solids currently stored in the Calcined Solids Storage Facilities (CSSF), also referred to as the bin sets, would be retrieved so that additional treatment can be performed to convert this waste to an acceptable final form. This project includes the modifications necessary to access the bin sets, the calcine retrieval systems that would be deployed in the bins, and the calcine transportation systems that would transfer the calcine to the treatment facilities.

Calcine would be remotely retrieved from the storage bin by two retrieval lines. The retrieval lines would be sized to fit inside the retrieval risers that extend from the top of the bins to the floor of the confinement enclosure. An air jet would fluidize the calcine and a suction nozzle would remove it from the bin and place it in the transport system. It is assumed (based upon testing of bin set stored calcine and pilot plant produced calcine) that the calcine would not be significantly agglomerated thus allowing the air jet to fluidize it. The transport system would then pneumatically convey the calcine to the treatment facility. The start of retrieval and the retrieval durations would support “just-in-time” delivery of the calcine to a waste treatment facility.

FACILITY DESCRIPTION: The bin sets are, simply, arrangements of large cylindrical vessels installed underground (to take advantage of the natural shielding) that are used to store the granular sand-like solids that resulted from the processing of high-level liquid waste in fluidized bed calciners. Confinement enclosures and Ventilation Instrumentation and Control buildings would be constructed for each bin set. The confinement enclosure, located on top of each bin set, would provide secondary confinement for bin set access and calcine retrieval activities. These enclosures would be prefabricated metal buildings. A negative pressure would be maintained inside the enclosures. The equipment necessary for retrieval would be housed inside the enclosure. It would be used to place retrieval equipment and remote drilling equipment. The surfaces of the enclosure would be coated with a strippable coating. The enclosure would be decontaminated several times; therefore workers can enter it, if necessary. A Ventilation Instrumentation and Control building would be located adjacent to each bin set. Each Ventilation Instrumentation and Control building would contain ventilation equipment for one bin set and its associated confinement enclosure. The instrumentation for the bin set and retrieval system would be located inside the Ventilation Instrumentation and Control building. The retrieval and transportation system would be located inside the Ventilation Instrumentation and Control building. The retrieval and transportation system would be operated from the Ventilation Instrumentation and Control building.

Existing retrieval risers would be accessed where available. However, retrieval risers would have to be remotely installed in bin sets 1, 2, and 3. A remote drilling platform would be used to drill through the concrete floor of the confinement enclosure on those bin sets and a resistance type welder would be used to install a stem to the top of each bin.

Table C.6.2-61. Construction and operations project data for the Calcine Retrieval and Transport Just-in-Time (59B)

Table C.6.2-62. Decontamination and decommissioning project data for the Calcine Retrieval and Transport Just-in-Time (P59B)

C.6.2.26 Vitrified HLW Interim Storage (P61)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide design, construction, startup, operation, and decommissioning of a facility to receive and store the vitrified non-separated waste. The storage would be for an interim period of time until a repository is ready to receive the waste.

PROJECT DESCRIPTION: The scope of included work for this project is the effort to construct, operate, and decommission a facility to receive and store the vitrified non-separated waste canisters. The vitrified treated waste would be placed in storage canisters that are qualified and approved for shipment to a repository. The canisters would be the same as those used at the Defense Waste Processing Facility (DWPF) at the Savannah River Site. The canisters would be loaded at the vitrification facility and sent directly to the Interim Storage Facility on a transfer cart through an underground transfer cart tunnel.

FACILITY DESCRIPTION: The Interim Storage Facility would be located at the INTEC and would be capable of receiving, handling, and storing the waste canisters. The Interim Storage Facility would be newly designed and constructed and sited adjacent to the process building.

The new Interim Storage Facility would be designed to hold waste canisters in vertical sealed storage tubes located in a concrete storage vault. The storage tube would provide structural support for the stacked canisters with each storage tube holding three canisters. The storage vault would have a concrete floor and walls with inlet and outlet air cooling ducts. The roof of the storage vault would be a composite steel and concrete structure called the charge face structure. The storage tubes would be located in holes in the charge face structure extending down to the floor of the storage vault. Removable shield plugs in the charge face structure would be removed and replaced as the canisters are placed in the storage tubes. Two canister-handling machines would be located above the charge face structure. The canister handling machines are designed to move and handle the canisters.

After each canister is prepared for storage at the process facility, it would be placed in a transfer cart. The transfer cart would then move to the new Interim Storage Facility through a below ground transfer cart tunnel to a transfer cart reception bay at the new Interim Storage Facility. The canister-handling machine would have overhead access to the canisters in the transfer carts and would remove the canisters from the handling cart through the charge hall floor up into a shielded storage cask. The waste-handling machine would then be positioned over the designated storage tube, where it would remove the shielded plug, place the canister in the tube, and replace the plug.

Supplementary lag storage locations would be provided at the end of the transfer cart tunnel to provide more immediate storage in the event of equipment maintenance or failure. This would help prevent a bottleneck in shipments from the production line. The work associated with the loading of the canister at the process facility and with the removal and shipping of the canisters to the disposal facility is not within the scope of this project.

Table C.6.2-63. Construction and operations project data for Vitrified HLW Interim Storage (P61)

Table C.6.2-64. Decontamination and decommissioning project data for Vitrified HLW Interim Storage (P61)

C.6.2.27 Packaging and Loading of Vitrified HLW at INTEC for Shipment to a Geologic Repository (P62A)

GENERAL PROJECT OBJECTIVE: The proposed project encompasses the handling and loading of transport casks with vitrified non-separated HLW canisters before immediate transport to the National Geological Repository. Rail transport is assumed with the rail cask modeled after an existing spent fuel transport cask. The handling and loading of casks would occur in the Interim Storage Facility after all canisters had been produced and transferred into the Interim Storage Facility from the vitrification facility. Handling and loading of casks would occur over a 20-year time period but would not start before the repository was opened to accept HLW. Loaded cask transport from the INEEL to the repository, subsequent handling at the repository, and empty cask return to the INEEL are beyond the scope of this study.

PROCESS DESCRIPTION: Approximately 11,700 canisters would be produced by the vitrification facility over a 20-year timeframe and stored in the Interim Storage Facility. Since the Interim Storage Facility is not designed to handle incoming canisters for storage and cask loading simultaneously, it is assumed that cask handling and loading of canisters would not start until all canisters had been produced and placed into interim storage. It is also assumed that cask loading would occur over a 20-year period.

Each canister would contain 0.72 cubic meters (nominal) of vitrified HLW and be based on the Savannah River Site-type stainless steel canister. All canisters would be remote handled and would be clean and without outer surface contamination prior to cask loading.

All shipments to the repository would require the use of a Type-B shielded shipping packaging (cask). The shipping cask chosen as the model for canister transport is the MP-187, a commercial, spent-fuel type, rail cask currently being processed for certification by the NRC. Each shipping cask would be capable of transporting four HLW canisters; however, to transport the HLW canisters in this cask, the application for NRC approval would need to be amended and approved by the NRC. In addition, the cask configuration would have to be modified to NRC requirements because the total plutonium content of four HLW canisters exceeds 20 Curies. This modification would also require NRC's approval.

An estimated 32 casks with internals and railcars (including standby units) would be required to continuously transport canisters to the repository. The round trip time duration of casks and railcars for an uninterrupted disposal operation is estimated to be four weeks and would require 16 casks to be in operation throughout the duration. The standby of eight empty casks with railcars at INEEL and eight at the repository would allow two extra weeks of time duration to accommodate loading, unloading, cask maintenance, weather, and railroad logistics problems. The Interim Storage Facility would load four canisters per day into a cask, thereby producing four casks per week for immediate transport to the repository. With four railcars loaded with casks shipped per week, 26 rail carrier trips to the repository would be made per year.

The packaging, loading, and transport process is as follows:

- Load four casks and railcars (duration one-week).
- Transport four casks and railcars by commercial train to a railhead near the repository (duration one-week).
- Transport four loaded casks from the railhead to the repository by truck and return with four empty casks (duration one-week).
- Return four empty casks with railcars via commercial train to the INEEL (duration one-week).

Table C.6.2-65. Construction and operations project data for the Packaging and Loading of Vitrified HLW at INTEC for Shipment to a Geological Repository (P62A).

Table C.6.2-66. Decontamination and decommissioning project data for the Packaging and Loading of Vitrified HLW at INTEC for Shipment to a Geologic Repository (P62A).

C.6.2.28 Mixing and Hot Isostatic Pressing (P71)

GENERAL PROJECT OBJECTIVES: The project described in this project summary is part of the Hot Isostatic Press (HIP) Waste Option for treating calcined waste at the INTEC. All of the sodium-bearing waste at the INTEC would be calcined through the existing New Waste Calcining Facility under a separate project. The HIPing process would involve mixing the calcine with amorphous silica and titanium powder in special cans, then applying a HIP technology to produce a glass-ceramic. The resulting product would then be packed into Savannah River Site (SRS) canisters for ultimate disposal in a national geological repository. The information presented here describes plans for the design, construction, and operation of HIP facilities.

PROCESS DESCRIPTION: This project directly interfaces with calcine retrieval at the front end and with HIP product interim storage at the back end (both are separate projects). The HIP facility would be set up in four separate process lines or trains, each of which is the same. Each of the four process lines would be designed to operate simultaneously with the other lines, but independent of them. This process description follows one line through from beginning to end.

Calcine treatment by mixing and HIPing begins by taking calcine from the retrieved-calcine storage hoppers (calcine retrieval is covered under another project) and transporting it to a temporary storage cell in the HIP facility. In the temporary storage cell, the calcine would be sized in a ball mill and fed into a storage/blending vessel (a ribbon blender). Pre-sized amorphous silica and titanium (or aluminum) powder would be added with the calcine in the blender in portions specified by the selected recipe. The mixture containing around 70% calcine is blended and about 1600 lbs. of the homogenous feed would be fed to a stainless steel HIP can (approximately 2 feet in diameter by 3 feet high). A lid with a venting tube would be welded to the can, and the filled can would be devolatilized for approximately 24 hours at about 650°C. The offgas would be vented to the offgastreatment system. The can would be evacuated to 0.5 torr, the vent/evacuation port is welded shut, and the can placed into one of 3 HIPing vessels. The HIPing vessel (filled with one can) would be pressurized with argon and heated to 1050°C. The final pressure inside the HIPing vessel after it is heated would be about 20,000 psi. The HIPing step (including overpacking, placement in the HIP vessel, pressurization, heatup, and time at temperature or soaking) would take about 24 hours.

After the HIPing step is complete the argon gas would be evacuated and analyzed for radioactivity to determine whether the HIP can was breached. (If it was breached that material would be recycled through the process). If the analysis indicates that the can was not breached, the can would be unloaded from the

HIPing machine and allowed to cool. Once an SRS disposal canister is filled with 3 HIP cans, the canister would be welded closed and transported to interim storage. (The interim storage facility, canister-transport tunnel, and cars are covered under another project.)

The HIPing facility would be designed for a production rate of 9 cans per day with an operating schedule consisting of 10 hour days, 4 days per week. A down time of 50% is allowed for maintenance. About 5,700 canisters of HIP HLW would be produced by the HIP facility.

FACILITY DESCRIPTION: The HIP facility would be located in close proximity to the bin sets. The HIP facility would be designed to house the equipment and operations for processing waste and provide essential features for safe and efficient operation and maintenance of the facility. Its layout is based on centrally located process cells with heavy concrete walls for shielding. Limited personnel access is provided. The cells are intended to house equipment that presents a high radiation hazard but requires minimal maintenance. The HIP facility would be set up on two levels: a below grade level and an above grade level. The cells on each level would be set up in four rows where each row houses a process train. An heating, ventilation, and air conditioning canyon would run between the first and second row and the third and fourth rows for a total of two heating, ventilation, and air conditioning canyons per level. On each level operating corridors would run around the outer perimeter of the four rows of cells and between the second and third rows of cells. This would cause each row to have an operating corridor next to one wall and on each end. The perimeter of the facility would contain office space, support facilities and non-radioactive operation areas. The building would occupy an area measuring 302 × 320 feet.

The HIP facility below-grade level would contain six cells in each of the four rows. These cells would provide storage for pallets of empty HIP cans and contain equipment for filling, welding and decontaminating the HIP cans. A cell for sizing/grinding off spec HIP cans would also be provided. Also, on the below grade level are the bottom of the HIP cell, which contains the HIPing furnace and the bottom of a cell for leading the final product canisters for transport to interim storage.

Each of the four rows in the above grade level would contain eleven process cells with 3-ft-thick reinforced concrete walls for shielding. Each set of eleven cells would contain blending equipment, decontamination chemical tank storage, a fill tank, and weld equipment. Also included would be decontamination, devolatilization/heat/weld, HIP, QA/assay, canister loading, load-out, remote maintenance, and crane maintenance cells. The HIPing and final loading cells would be continued from below grade.

Table C.6.2-67. Construction and operations project data for the Mixing and Hot Isostatic Pressing (P71).

Table C.6.2-68. Decontamination and decommissioning project data for the Mixing and Hot Isostatic Pressing (P71).

This page intentionally left blank.

C.6.2.29 Interim Storage of Hot Isostatic Pressed Waste (P72)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide design, construction, startup, operation, and decommissioning of a facility to receive and store the waste-filled canisters produced in the Hot Isostatic Press (HIP) option. The storage would be for an interim period of time until a repository is ready to receive the waste.

PROJECT DESCRIPTION: This project provides for a facility for the interim storage of the waste-filled canisters produced by the HIPed Waste option. The HIP treated waste would be placed in storage canisters that are qualified and approved for shipment to a repository. It is estimated that the HIP process option would generate 5,700 canisters. The Savannah River Site-type canisters would be loaded at the HIP Facility and sent directly to the Interim Storage Facility on a transfer cart through an underground transfer cart tunnel. The canisters would be delivered at a rate of 3 per day.

Two Interim Storage Facility concepts (a new or modified existing facility) have been evaluated for the storage of the HIP waste. Either facility would be located at the INTEC and would be capable of receiving, handling, storing, retrieving, and loading the waste canisters.

NEW FACILITY DESCRIPTION: If a new Interim Storage Facility is built, it would be all new design and construction and would be sited adjacent to the HIP Facility. Storage tubes in the new Interim Storage Facility would hold waste canisters in vertical sealed storage tubes located in a concrete storage vault with each storage tube holding three canisters.

After each canister is prepared for storage at the process facility, it would be moved on a transfer cart through a below ground transfer cart tunnel to a reception bay at the new Interim Storage Facility. The canister-handling machine would have overhead access to the canisters in the transfer carts and would remove the canisters from the handling car. The canister-handling machine would then be positioned over the designated storage tube, where it would remove the shielded plug, place the canister in the tube, and replace the plug.

Supplementary lag storage locations would be provided at the end of the transfer cart tunnel to provide more immediate storage in the event of equipment maintenance or failure. This would help prevent a bottleneck in shipments from the production line.

When the waste canisters are removed for shipment to disposal, the process would be reversed. The canisters would be moved from the storage tube by the canister-handling machine to a location directly above the shipping cask bay and placed in the shipping cask. A rail car load-out bay called the shipping cask bay would be incorporated into the facility. A specialized cask maneuvering hydraulic platform would be provided to upright and recline the shipping cask for loading while on the rail car.

MODIFIED EXISTING FACILITY: If an existing building is to be modified rather than building a new one, the modified Interim Storage Facility would be located in the building originally built to contain the Fuel Processing Restoration process. That project was cancelled with the building mostly finished, but before most of the process equipment was installed. Internal specific areas of the building would have to be modified and/or finished to provide the modified Interim Storage Facility. The major reason that the Fuel Processing Restoration building was evaluated for the modified Interim Storage Facility are the existing concrete vaults that would have held the radioactive process equipment.

The modified Interim Storage Facility was designed to hold waste canisters in vertical sealed storage tubes. The storage tubes would be located in a concrete storage vault just as described for a new facility but would hold four canisters.

The concrete walls between the existing process vaults would be removed to form one storage vault. A steel grid arrangement would be installed on the existing concrete floor of the vault to level and position the storage tubes, and a steel lining would be installed on the east vault wall to provide the additional necessary personnel shielding. The bottoms of the storage tubes would be sealed with steel plate and the tops would be closed with steel shield plugs. Spacers would be used at the top of the pipes to position them and provide radiation shielding. The spacers and the pipes would be welded together to provide adequate air sealing so the fans can force the flow of cooling air from east to west. The combinations of spacers and pipe plugs would form a relatively flat floor.

After each canister is prepared for storage at the process facility, it would moved in a transfer cart into a shielded storage cask just as described above for a new Interim Storage Facility. Likewise, a shipping cask bay is incorporated into the facility and would be equipped with specialized cask maneuvering hydraulic platform.

Table C.6.2-69. Construction and operations project data for the Interim Storage of Hot Isostatic Pressed Waste (P72).

Table C.6.2-70. Decontamination and decommissioning project data for the Interim Storage of Hot Isostatic Pressed Waste (P72).

C.6.2.30 Packaging and Loading Hot Isostatic Pressed Waste at INTEC for Shipment to a Geologic Repository (P73A)

GENERAL PROJECT OBJECTIVES: The proposed project encompasses the handling and loading of transport casks with Hot Isostatic Pressed (HIPed) high-level waste (HLW) canisters preparatory to immediate transport to the National Geological Repository. Rail transport is assumed with the rail cask modeled after an existing spent fuel transport cask. The handling and loading of casks would occur in the Interim Storage Facility after all HIPed canisters have been produced and transferred into the Interim Storage Facility from the HIP Facility. The HIP would produce about 5,700 canisters. Handling and loading of casks would occur over a 20-year time period but would not start before the repository was opened to accept HLW.

Loaded cask transport from the INEEL to the repository, subsequent handling at the repository, and empty cask return to the INEEL are not part of this project.

PROJECT DESCRIPTION: Approximately 5,700 HIPed canisters would be produced by the HIP Facility over a 20-year timeframe and stored in the Interim Storage Facility. Canister production as proposed would start in January 2015 and end in December of 2035. It is assumed that cask handling and loading of canisters would not start until all canisters had been produced and placed into interim storage because the Interim Storage Facility is not designed to handle incoming canisters for storage and cask loading simultaneously. Operations for this project would begin with cask loading, which is assumed to occur over a 20-year period.

Each canister would contain 0.72 cubic meters (nominal) of HIPed HLW (three HIP cans containing a glass-ceramic waste material) and be based on the Savannah River Site Defense Waste Processing Facility stainless steel canister design. All canisters would be remote handled and would be clean and without outer surface contamination prior to cask loading.

All shipments to the repository would require the use of a Type-B shielded shipping packaging (cask). The shipping cask chosen as the model for canister transport is the MP-187, a commercial, spent-fuel type, rail cask currently being processed for certification by the NRC. Each shipping cask would be capable of transporting four HLW canisters; however, to transport the HIPed HLW in this cask, the application for NRC approval would need to be amended and approved by the NRC. In addition, the cask configuration would have to be modified to NRC requirements because the total plutonium content of four HLW canisters exceeds 20 Curies. This modification would also require NRC's approval.

The Interim Storage Facility would load two canisters per day into a cask, thereby producing two casks per week. Two weeks of cask loading would provide four casks/railcars ready for immediate transport to the repository. An estimated 24 casks with internals and railcars (including standby units) would be required to continuously transport the HIPed canisters to the repository. The round trip time duration of casks and railcars for an uninterrupted disposal operation is estimated to be five weeks requiring 16 casks to be in operation throughout the duration. The standby of four empty casks with railcars at INEEL awaiting loading and four at the repository unloaded, or waiting to be unloaded, would allow two extra weeks of time duration to accommodate loading, unloading, cask maintenance, weather, railroad logistics, and other problems. With four railcars with loaded casks shipped every other week, approximately 9 rail carrier round trips from the INEEL to the repository and back could be made per year.

The loading, and transport logic is presented as-follows:

- Load four casks and railcars (duration two-weeks).
- Transport four casks and railcars by commercial train to a railhead near the repository (duration one-week).
- Transport four loaded casks from the railhead to repository by truck and return with four empty casks (duration one-week).
- Return four empty casks with railcars via commercial train to the INEEL (duration one-week).

Table C.6.2-71. Construction and operations project data for Packaging and Loading of Hot Isostatic Pressed Waste for Shipment to a Geologic Repository for Waste Processing (P73A).

Table C.6.2-72. Decontamination and decommissioning project data for Packaging and Loading of Hot Isostatic Pressed Waste for Shipment to a Geologic Repository for Waste Processing (P73A).

C.6.2.31 Direct Cement Process (P80)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide information for the design, construction, startup, operation, and decommissioning of a new Direct Grouting Facility under the Direct Cement Option. The facility would be used to directly grout the INTEC calcine, including calcined SBW waste, into a cementitious waste form for disposal as high level waste (HLW). Under a separate project, the waste filled canisters would be put in interim storage until final repository space is available for their disposal.

PROJECT DESCRIPTION: In the hydroceramic grouting process, calcined HLW and calcined sodium-bearing waste (SBW) would be combined with clay, blast furnace slag, and caustic soda to generate a hydroceramic form of naturally occurring feldspathoids/zeolites. The grouting process is used, which generally involves the following steps:

- Mixing a thick paste of calcine and hydroceramic additives.
- Casting the paste into a waste canister.
- Curing the hydroceramic under temperature and pressure.
- Removing the free water from the hydroceramic by baking.
- Sealing the canister.

The process is described in more detail below.

Calcine would be received at the grouting facility on demand for batch processing via the Calcine Retrieval and Transport System. Once the grout recipe is determined, the calcine blend and the grout ingredients consisting of clay, blast furnace slag, sodium hydroxide, and water would be delivered through a series of blenders and mixers to a kneeder extruder for final mixing. From the kneeder extruder the grout mixture would be delivered to the canister injection head through which each canister is filled with approximately 1,225 kg (2,700 lb) of grout. The waste would be grouted into Savannah River Site Defense Waste Plant Facility HLW stainless steel canisters measuring 0.6 m (24 inches) in diameter by 3 m (10 foot) in length.

Grout curing would occur in saturated steam conditions through an autoclave process operating in the range of 250° C (577 psia) to 300° C (1,246 psia). Eighteen canisters at a time would be placed in the single autoclave that would operate through a 48-hour cycle.

Following curing, the canisters would be removed from the autoclave and sent to the dewatering chambers. Dewatering serves to dry the cured grout in the canisters such that the residual moisture content of the grout is less than 2% of the grout by weight. Total time in the dewatering cycle would be approximately seven days. The chambers would be sized to accommodate 50 canisters.

From the dewatering chamber, the canisters would travel to the welding room where the canisters' caps would be remotely installed and welded in place. After welding and testing steps are complete, the canisters are once again be processed through a decontamination check station for surface surveys and cleaning, if required.

Canisters that have completed the process through the grouting facility would be sent to interim storage via an underground tunnel connecting the grouting and interim storage facilities. The interim storage facility and operations are covered in another project description.

NEW FACILITY DESCRIPTION: The grouting facility would be located in the northeast area of INTEC within the existing security perimeter fence. No previously undisturbed soils would be affected. The estimated size of the facility would be approximately 18,327 m^2 (197,275 $feet^2$).

The grouting facility would be designed to house all activities involving the grouting process from receipt of calcine and grout ingredients to preparation of the filled canisters for transfer to the interim storage facility. Radiological shielding would be incorporated into the facility designs and criticality is not a concern. The design would be based on a concept of centrally located process cells with thick concrete walls surrounded by areas that contain progressively less radioactive hazards. Equipment in radioactive service that requires maintenance would be located in areas with remote handling and maintenance capabilities. Radiological contamination control would be maintained throughout the process through the use of engineered building boundaries, filtration systems, and canister surface checks and cleaning. Off gassing from the various tanks and vessels would be routed through a high-efficiency particulate air (HEPA) filtration system.

All processes would be operated remotely from a control room with a number of operations requiring robotic handling. Processes involving calcine and the grouted waste form would be performed remotely and under computer control. Robotic handling would include remotely controlled canister movement through the facility and canister manipulation at the filling station, monitoring and decontamination stations.

Table C.6.2-73. Construction and operations project data for the Direct Cement Process (P80)

Table C.6.2-74. Decontamination and decommissioning project data for the Direct Cement Process (P80)

This page intentionally left blank.

C.6.2.32 Unseparated Cementitious HLW Interim Storage (P81)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide design, construction, startup, operation, and decommissioning of a facility to receive and store the waste-filled canisters produced in the Direct Cement option. The storage would be for an interim period of time until a repository is ready to receive the waste.

This project does not include the transfer cart loading area in the process facility and associated equipment, the rail car and cask, or the railroad tracks. Additionally, the loading of the canister at the process facility as well as the removal and shipping of the canister to the disposal facility are not included in this project.

PROJECT DESCRIPTION: The scope of this project includes construction, operation, and decommissioning the facility where the treated waste would be placed in storage canisters that are qualified and approved for shipment to a repository. The canisters would be the same as those used at the Defense Waste Processing Facility at the Savannah River Site. After each canister is prepared for storage at the process facility, it would be placed in a transfer cart. The transfer cart would then move to the new Interim Storage Facility through a below ground transfer cart tunnel to a transfer cart reception bay at the new Interim Storage Facility. The canister-handling machine would have overhead access to the canisters in the transfer carts. The canister-handling machine would remove the canisters from the handling cart through the charge hall floor up into a shielded storage cask. The waste-handling machine would then be positioned over the designated storage tube, where it would remove the shielded plug, place the canister in the tube, and replace the plug.

FACILITY DESCRIPTION: The Interim Storage Facility would be a new facility located at the INTEC, adjacent to the process building, and would be capable of receiving, handling, and storing the waste canisters.

The new Interim Storage Facility would be designed to hold waste canisters in vertical sealed storage tubes. The storage tubes would be located in a concrete storage vault. The storage tube would provide structural support for the stacked canisters. Three canisters would be placed in each storage tube. A cushion block would be placed between each of the canisters and between the bottom canister and the bottom of the storage tube.

The storage vault would have a concrete floor and walls with inlet and outlet air cooling ducts. The roof of the storage vault would be a composite steel and concrete structure called the charge face structure.

The storage tubes would be located in holes in the charge face structure extending down to the floor of the storage vault. Removable shield plugs in the charge face structure would be removed and replaced as the canisters are placed in the storage tubes.

Supplementary lag storage locations would be provided at the end of the transfer cart tunnel to provide more immediate storage in the event of equipment maintenance or failure. This would help prevent a bottleneck in shipments from the production line.

Table C.6.2-75. Construction and operations project data for Unseparated Cementitious HLW Interim Storage (P81).

Table C.6.2-76. Decontamination and decommissioning project data for Unseparated Cementitious HLW Interim Storage (P81).

C.6.2.33 Packaging and Loading Cementitious Waste at INTEC for Shipment to a Geologic Repository (P83A)

GENERAL PROJECT OBJECTIVES: The proposed project encompasses the handling and loading of transport casks with Cement canisters before immediate transport to a Geologic Repository. The handling and loading of casks would occur in the Interim Storage Facility after all waste canisters had been produced and transferred into the Interim Storage Facility from the cement facility. Handling and loading of casks would occur over a 20-year time period but would not start before the repository was opened to accept high-level waste (HLW).

Loaded cask transport via rail from the INEEL to the repository, subsequent handling at the repository, and empty cask return to the INEEL are not part of this project.

PROJECT DESCRIPTION: Approximately 18,000 canisters would be produced by the grouting facility and stored in the Interim Storage Facility. Canister production as proposed would start in January 2015 and end in December of 2035. It is assumed that cask handling and loading of canisters would not start until all canisters had been produced and placed into interim storage because the Interim Storage Facility (as currently proposed) would not be designed to handle incoming canisters for storage and cask loading simultaneously. Operations for this project would begin with cask loading which would occur over a 20-year period.

Each canister would contain 0.72 cubic meters (nominal) of HLW and be based on the Savannah River Site Defense Waste Processing Facility stainless steel canister design. All canisters would be remote handled and would be clean and without outer surface contamination prior to cask loading.

All shipments to the repository would require the use of a Type-B shielded shipping packaging (cask). The shipping cask chosen as the model for canister transport is the MP-187, a commercial, spent-fuel type, rail cask currently being processed for certification by the NRC. Each shipping cask would be capable of transporting four HLW canisters; however, to transport the Cement HLW in this cask, the application for NRC approval would need to be amended and approved by the NRC. In addition, the cask configuration would have to be modified to NRC requirements because the total plutonium content of four HLW canisters exceeds 20 Curies. This modification would also require NRC's approval.

The Interim Storage Facility would load five (5) canisters per day into several casks, thereby producing five (5) casks per week for immediate transport to the repository. With five (5) railcars with loaded casks being shipped every week, then approximately 12 rail carrier round trips from the INEEL to the repository and back could be made per year.

An estimated 40 casks with internals and railcars (including standby units) would be required to continuously transport the canisters to the repository. The round trip time duration of casks and railcars for an uninterrupted disposal operation is estimated to range between four (4) and six (6) weeks and would require 20 casks to be in operation throughout the duration. The standby of 10 empty casks with railcars at INEEL awaiting loading and 10 at the repository unloaded or waiting to be unloaded would allow two extra weeks of time duration to accommodate loading, unloading, cask maintenance, weather, railroad logistics, and other problems.

The loading, and transport logic is presented as-follows:

- Load five (5) casks and railcars (duration one-week).
- Transport five (5) casks and railcars by commercial train to a railhead near the repository (duration one-week).
- Transport five (5) loaded casks from the railhead to the repository by truck and return with four empty casks (duration one-week).
- Return five (5) empty casks with railcars via commercial train to the INEEL (duration one-week).

Table C.6.2-77. Construction and operations project data for Packaging and Loading of Cementitious Waste at INTEC for Shipment to a Geologic (P83A).

Table C.6.2-78. Decontamination and decommissioning project data for Packaging and Loading of Cementitious Waste at INTEC for Shipment to a Geologic Repository (P83A).

C.6.2.34 Early Vitrification Facility with Maximum Achievable Control Technology (P88)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide design, construction, startup, operation, and decommissioning of a new Early Vitrification Facility to process liquid waste from the Tank Farm and high level waste (HLW) solid calcine. Liquid waste would include either sodium-bearing waste (SBW) or non-SBW liquid which is also known as newly generated liquid waste (NGLW). The liquid waste and the dry calcine granules would be converted into a geologically stable borosilicate glass suitable for disposal. The glass produced from the liquid waste would be remote-handled transuranic waste that would be disposed of at the Waste Isolation Pilot Plant. The glass produced from the calcine would be HLW that would be disposed of at the National Geologic Repository.

PROJECT DESCRIPTION: The Early Vitrification project includes the Early Vitrification Facility for vitrifying and packaging calcine and liquid waste, an SBW (and NGLW) retrieval and transport system for transporting liquid waste from the Tank Farm to the Early Vitrification Facility, and a grout plant for stabilizing Process Equipment Waste Evaporator bottoms resulting from processing of the Early Vitrification Facility offgas liquid. The Early Vitrification process is designed to vitrify both calcine and liquid wastes. Liquid wastes would be mixed with glass frit and fed to the melter in the dry condition. Liquid waste and calcine would be treated in separate campaigns. The liquid waste would be collected continuously in the Early Vitrification Facility, and then vitrified and packaged in one or two campaigns per year.

The vitrified waste would be placed in glass storage canisters that are qualified and approved for shipment to a repository. The canisters for the HLW-glass and a small quantity of LLW-glass would be the same as those used at the Defense Waste Processing Facility at the Savannah River Site. They are 2 feet in diameter and 10 feet in length. The canisters would be loaded at the Vitrified Product Process Facility and sent directly to the Interim Storage Facility on a transfer cart through an underground transfer cart tunnel. WIPP half-canisters would be used for the remote-handled transuranic glass.

Both the liquid waste and the dry calcine would have to be blended with additional chemicals to form glass. In the Early Vitrification Facility, these chemicals would be received as specially-formulated powdered glass called frit. Because of the many chemistries of liquid waste and many types of calcine generated at INTEC, the chemical compositions to be vitrified are not uniform. Based on laboratory work, up to six different frit formulations would be needed to make acceptable glass with the liquid waste calcine. The Early Vitrification Facility would provide equipment to store and blend liquid waste or calcine with the frit, melt those materials to form glass, cast the glass into appropriate canisters, manage full and empty canisters, and treat liquid and gaseous effluents.

NEW FACILITY DESCRIPTION: The Early Vitrification Facility would be located near the northeast corner of the INTEC. The facility would be a multistory building that would extend from elevations of 32 feet below grade, to 75 feet above grade, and would have a floor plan occupying an area measuring 433 feet x 178 feet. The Early Vitrification Facility layout would be based on a centrally located process-cell complex with limited personnel access and heavy concrete walls for shielding. The facility would have a separate system for processing melter offgas and reclaiming mercury waste.

The heart of the Early Vitrification Facility would be the vitrification system that would include the melters and the offgas treatment system with its scrubber blowdown processing systems. Liquid waste and calcine would be vitrified in separate campaigns and would not be mixed or melted together in the same campaign. The liquid waste would be pumped to the process. The pumping system would consist of a tie-in in to an existing INTEC Tank Farm valve box, a lift station to pump the liquid to a transport line, and a 1,200-ft long transport line from the lift station to the vitrification system. The vitrification system would receive liquid waste, dry calcine, and frit, from separate handling systems. Liquid waste from the Tank Farm would be received by two 24,000-gallon storage tanks in the Early Vitrification Facility.

Liquid waste from other sources would be transferred into one of the two storage tanks and blended before being characterized. After the liquid has been characterized, it would be transferred to one of two 8,000-gallon tanks for mixing with the appropriate frit. Additional characterization would be performed on the mixture as part of the certification process. Once the contents of a mix tank would be certified, the entire volume of the tank would be transferred to one of two feed tanks. Each mix tank and each feed tank would hold enough liquid and frit mixture for about one day of operation.

Dry calcine form the existing storage bins would be received and stored in two large blender tanks. The calcine would be fluidized and homogenized in each blender tank by air injection systems. A secondary pneumatic transfer system for each tank would deliver calcine to a weigh hopper that would measure and dispense it into a ribbon blender for mixing with a measured amount of frit. This mixture would then be dispensed into the melter.

Each type of frit would be conveyed to a separate silo outside the Early Vitrification Facility. Other sets of conveyors would transport the frit into six separate indoor storage tanks. The proper frit would be conveyed from these tanks to the frit weigh tank, and finally to a mix tank for mixing with liquid waste or to the ribbon blender where it would be mixed with dry calcine and dispensed into the melter.

The Early Vitrification Facility would include two joule heated (i.e., electrically powered) melters. One would be installed as a spare. The feed material, called "batch", would be a mixture of liquid waste or dry calcine and dry frit. Before melting, the feed material would float on top of the molten glass, forming a "cold cap" that would reduce emissions of volatile species in the melter offgas. Large quantities of condensable, low-quality steam would be released as the liquid waste and frit mixture would contact the melter cold cap. The steam would be exhausted from the melter by the offgas ventilation system, and condensed and treated in the offgas system components. Product glass would be gravity drained through a separate port into the canisters.

A limited amount of ventilation air would be allowed to enter the melter to cool instrument and viewing ports. The ventilation air would collect steam, volatile gases, and fine particulates, that would later be removed in the offgas treatment system. The offgas treatment train would include a Noxidizer™ (a two-chambered incinerator designed to chemically reduce NO_x and oxidize organics), a quench column, a venture, a packed bed absorber, and a granular activated carbon column. Contaminated water form the offgas treatment system would be processed in the Early Vitrification Facility to collect and immobilize mercury. Elemental mercury from the activated carbon absorber system and from the wastewater would be amalgamated. Further treatment of the scrubber blowdown water would be performed at other facilities at the INTEC.

The vitrified remote handled transuranic waste glass from the liquid waste would be drained from the melter into Waste Isolation Pilot Plant canisters, and the vitrified HLW glass from the calcined waste would be drained from the melter into Defense Waste Processing Facility-type canisters. The canisters would then be cooled, capped, and transported through three separate cells for lid welding and leak checking, decontamination, and exterior contamination swiping. Finally, the filled canisters would be placed in a below-grade tunnel and transferred to a separate Interim Storage Facility located near the Early Vitrification Facility.

Table C.6.2-79. Construction and operations project data for the Early Vitrification Facility with Maximum Achievable Control Technology (P88).

Table C.6.2-80. Decontamination and decommissioning project data for the Early Vitrification Facility with Maximum Achievable Control Technology (P88).

C.6.2.35 Packaging and Loading Vitrified SBW at INTEC for Shipment to the Waste Isolation Pilot Plant (P90A)

GENERAL PROJECT OBJECTIVES: This project includes the handling and loading of shipping casks with remote handled Waste Isolation Pilot Plant (WIPP) type containers containing transuranic waste before immediate truck transport to WIPP for disposal. The interim storage, handling, and loading of casks and containers would occur in the Interim Storage Facility. The transuranic waste would be processed in the Early Vitrification Facility. Handling and loading of casks would occur over a 26-year period but would not start before WIPP was opened to accept transuranic waste. Loaded cask transport from the INEEL to WIPP, subsequent handling at WIPP, and empty cask return to the INEEL are not part of this project.

PROJECT DESCRIPTION: Approximately 900 remote-handled WIPP half-canisters would be produced by the Early Vitrification Facility over a 21-year timeframe and transferred to the Interim Storage Facility for interim storage and cask loading prior to shipment to WIPP for disposal. Interim storage would be provided in the Interim Storage Facility to allow for accumulation before shipment. Production would start in January 2015 and end in December of 2035.

Each remote-handled WIPP half-canisters would contain about 0.4 cubic meters of vitrified transuranic waste to satisfy NRC fissile-gram equivalent (FGE) requirements. All remote-handled WIPP containers without outer surface contamination prior to cask loading.

The shipping cask designated for use by this project would be the remote-handled TRU 72-B, developed for remote-handled WIPP container transport. One cask would be carried on a trailer for truck transport to WIPP. The cask has been tested and licensed by the NRC for transuranic waste ground shipment. Each shipping cask would be capable of transporting one remote-handled WIPP container; however, the containerized waste would require NRC approval as an authorized cask content prior to any shipment.

The Early Vitrification Facility three-year regime would produce approximately 14 remote-handled WIPP half-canisters per week. Four half-canisters would be loaded each week and the remainder (10) placed into interim storage for future transport. The additional containers (about 90) produced over the following years would be generated at about 1.9 remote-handled containers per year. At the end of the first three-years of production approximately 820 half-canisters would be stored in the Interim Storage Facility awaiting transport to WIPP.

The Interim Storage Facility would load about two casks per week with each cask containing 1-2 remote-handled WIPP half-canisters. If two trailers with loaded casks were shipped every week, then approximately 90 truck carrier round trips from the INEEL to WIPP could be made per year. The decision to provide shipments of two casks per week to WIPP would reduce the quantity of remote-handled WIPP containers placed into interim storage during the first three years of Early Vitrification Facility operation.

An estimated 16 cask and trailer units (including standby units) would be required to continuously transport the remote-handled WIPP containers to WIPP. The round trip time duration of casks and trailers for an uninterrupted disposal operation is estimated to be four weeks, requiring 8 casks to be in operation throughout the duration. The standby of 4 empty casks with trailers at INEEL awaiting loading and 4 at WIPP, unloaded or waiting to be unloaded, would allow two extra weeks to accommodate loading, unloading, cask maintenance, weather, trucking logistics, and other problems. The loading, and transport logic is presented as-follows:

- Load two casks/trailers (duration one-week).
- Transport two casks/trailers by commercial truck transport to WIPP (duration one-week).
- Unload two casks/trailers at WIPP and pickup two empty casks/trailers (duration one-week).
- Return two empty casks/trailers via commercial truck transport to the INEEL (duration one-week).

Table C.6.2-81. Construction and operations project data for the Packaging and Loading of Vitrified SBW at INTEC for Shipment to the Waste Isolation Pilot Plant (P90A).

Table C.6.2-82. Decontamination and decommissioning project data for the Packaging and Loading of Vitrified SBW for Shipment to the Waste Isolation Pilot Plant (P90A).

C.6.2.36 SBW and Newly Generated Liquid Waste Treatment with Cesium Ion Exchange of Contact-Handled Transuranic Grout and Low-Level Waste Grout (P111)

GENERAL PROJECT OBJECTIVE: The proposed project provides for design and construction of a new treatment facility for processing the existing sodium-bearing waste (SBW) by a means other than calcination and for processing Type I and Type II newly generated liquid waste at the INTEC. Type I and Type II are defined as follows:

- Type I liquid waste - Liquid radioactive waste generated at the New Waste Calcining Facility (NWCF) associated with NWCF operations and the decontamination of the NWCF.
- Type II liquid waste - Liquid radioactive waste not associated with the calciner operation or decontamination. This waste originates from other facilities at the INTEC, Test Reactor Area, and Test Area North. The quantity of Type II wastes are very small.

PROCESS DESCRIPTION: This project would produce a contact-handled transuranic grout, a small quantity of ion-exchange resin saturated with cesium isotopes removed from the SBW, and a low-level grout from the newly generated liquid waste. A small amount of transuranic waste in the form of undissolved solids would also be produced, but it would be blended with the contact-handled transuranic grout. For disposal, the contact-handled transuranic grout would be sent to the Waste Isolation Pilot Plant (WIPP), the low-level waste (LLW) grout would remain at INEEL, and the resin would be sent with the high-level waste (HLW) calcine to Hanford for vitrification.

The treatment facility would begin processing activities in 2009. Until then, all newly generated liquid waste and the existing SBW would be stored in the existing Tank Farm. From 2009 through 2012, SBW and newly generated liquid waste would be processed together until the SBW processing is completed. Newly-generated liquid waste would then be processed through 2025, the time when operations would be completed. The quantity of Type II wastes would be very small and this project assumes there is no separation of Type II waste from the SBW and Type I waste. From 2013 through 2019, the generation of Type I waste would rapidly decrease and the Type II waste would increase from about 3% of the newly generated liquid waste in 2013 to about 60% in 2015. The generation of Type I and II after 2014 would be constant at approximately 2,000 gallons per year. Because of this significant change in operation demands, the operating schedule has been divided into Primary Operations dates, which are from 2011 through 2015, and Reduced Operations dates from 2016 through 2025.

The treatment of the wastes includes the following basic steps:

- remove cesium from the existing SBW liquid
- evaporate the remaining liquid to a specified solids concentration
- neutralize the waste by the addition of calcium oxide
- mix the waste with portland cement, blast furnace slag, and flyash to produce a grouted waste form
- place the grouted waste into 55-gal waste drums

The grouted waste in the 55-gal waste drums, from 2009 through 2012, would be contact-handled transuranic waste which would be ready for shipment to WIPP. The major waste form between 2013 and 2025 would be LLW, due to the reduction in the Type I to Type II ratio. This LLW would also be mixed into a grouted form which would be ready for disposal in a LLW landfill.

FACILITY DESCRIPTION: The new facility would be located to the west of the Non-Separations facilities near the northeast corner of the INTEC. This 2-story building would be above grade with the exception of below grade canyon areas for process lines. The areas of the building requiring the most radiological shielding (5 feet thick concrete walls) would be the ion exchange rooms and the packaging and loading high bay which are centrally located. Except for the rooms where raw grouting and neutralization materials are handled, all processing rooms would be considered radiation areas with operations being performed remotely. The SBW and newly generated liquid waste would be brought to the facility through a new underground pumping/piping system which would interface with the treatment facility in the underground canyon vault and connects to the existing Tank Farm.

Treatment process components and systems housed in the facility include:

- A system to retrieve the liquid waste and transfer it to the treatment facility
- Storage tank sized for 24-hour operations
- A system to adjust the pH of SBW feed to increase Cs removal
- Ion exchange columns filled with a crystalline silicotitanate sorbant to remove Cs from the filtered waste
- A tank to provide holding capacity for ion exchange effluent

- An evaporator to concentrate and partially crystallize the ion exchange effluent
- A tank which serves both as a neutralization tank for the concentrated waste and a feed tank for the grouting process
- A system to add CaO to the concentrated waste to neutralize it
- Storage bins for grout additives
- A grout mixing tank
- A system to clean the grout mixing tank
- A system to load grouted waste into 55-gal drums
- Assay equipment to determine radionuclide concentrations in the drums of grouted waste
- A system to back-flush, drain, and dry spent sorbant columns
- A heater, filters, and blower to superheat, remove particulate, and exhaust noncondensible gases from the process.

The packaging and loading area would be a shielded high bay to accommodate the remote handling of the spent sorbant containers. The principle product would be contact-handled transuranic waste drums which can be loaded into a container in either the shielded high bay or in the unshielded truck loading bay. Radioactively hot and cold areas are provided for use in the various radioactive and non-radioactive maintenance activities required in a facility of this nature.

Table C.6.2-83. Construction and operations project data for the SBW and Newly Generated Liquid Waste Treatment with Cesium Ion Exchange to Contact-Handled Transuranic Grout and Low-Level Waste Grout (P111).

Table C.6.2-84. Decontamination and decommissioning project data for the SBW and Newly Generated Liquid Waste Treatment with Cesium Ion Exchange to Contact-Handled Transuranic Grout and Low-Level Waste Grout (P111).

C.6.2.37 Packaging and Loading Contact-Handled Transuranic Waste for Shipment to the Waste Isolation Pilot Plant (P112A)

GENERAL PROJECT OBJECTIVES: The proposed project encompasses the handling and loading of transport casks with contact handled 55 gallon drums containing transuranic waste before immediate transport to the Waste Isolation Pilot Plant (WIPP) for disposal. Truck transport is assumed with transport casks modeled after an existing spent fuel transport cask. The handling and loading of casks and drums would occur in the Sodium-Bearing Waste (SBW)/Newly Generated Liquid Waste Facility. No interim storage would be provided. The drums would be of standard 55 U.S. Gallon configuration ready for shipment; therefore, there would be no waste packaging issues relative to this project. Handling and loading of casks would occur over a four-year period but would not start before WIPP was opened to accept Transuranic (TRU) waste.

Loaded cask transport from the INEEL to WIPP, subsequent handling at WIPP, and empty cask return to the INEEL are not part of this project.

PROCESS DESCRIPTION: Approximately 37,500 TRU drums would be produced over a four-year timeframe and shipped directly to WIPP for disposal. About 20 drums would be produced in the facility and loaded into casks per day. No interim storage would be provided.

Each drum would contain about 0.2 cubic meters of powdered or granulated transuranic waste and would satisfy NRC fissile-gram equivalent requirements. All drums would be contact handled due to calculated gamma radiation levels of-less-than 200 mR/hr at contact. The calculated maximum thermal output per drum would be 0.4 Watts. All drums would be clean and without outer surface contamination prior to cask loading. The estimated maximum weight of each drum would be 777 pounds. Nine drums and five empty drums (49 pounds/drum) would be required to fill a TRUPACT-II cask (14 drums total) and achieve a total payload weight of about 7,238 pounds. The weight of all drums is less than the maximum cask payload allowable of 7,265 pounds.

All shipments to WIPP would require the use of a Type-B shipping package (cask) per the requirements of the U.S. Nuclear Regulatory Commission 10 CFR 71 and Department of Transportation Hazardous Materials Regulations. Only those packagings that have been approved by the U.S. Nuclear Regulatory Commission as meeting the applicable NRC requirements of 10 CFR 71 are suitable for these transports.

The shipping cask identified for contact handled WIPP drum transport is the TRUPACT-II; a commercial cask designed for transuranic contact-handled waste. Three casks would be carried on a trailer for truck transport to WIPP. Each shipping cask would transport a transuranic drum to WIPP; however, the contents would have to be listed within the transuranic content transport codes for the TRUPACT-II prior to any shipment. No cask shipment may exceed a 325 fissile-gram-equivalent of plutonium-239.

Each shipping cask would include the internal “payload pallet” required for the linear and radial positioning and support of the drums. Three casks would be carried on one dedicated trailer. Three casks with payload pallets plus a trailer would be purchased as a unit; however, the casks and trailer of each unit must be interchangeable with other units. The estimated weight of each loaded shipping cask would be about 9.61 tons: approximately 5.99 tons for the cask and 3.62 tons for the payload.

The 20 drums per day or 140 drums per week would be loaded for immediate transport to WIPP. Since 27 TRU drums and 15 empty drums are required to fill three casks for one trailer load, there would be about 5.2 trailer loads per week transported to WIPP. For cask/trailer quantity determination, and simplicity, six trailer loads (18 casks) would be used per week for this project. It is assumed that 18 personnel would be dedicated to cask loading.

An estimated 108 casks with payload pallets and 36 trailers (including standby units) would be required to continuously transport the drums to WIPP. The round trip time duration of casks and trailers for an uninterrupted disposal operation is estimated to be four weeks, requiring 24 casks and eight trailers to be in operation throughout the duration. The standby of 18 empty casks with six trailers at INEEL, awaiting loading, and 18 casks with six trailers at WIPP, unloaded or waiting to be unloaded, would allow one extra week to accommodate loading, unloading, cask maintenance, weather, trucking logistics, and other problems. Considering 200 operations work-days per year (about 28.5 weeks), a 24-hour-a-day seven-day workweek operation, and six trailers with 18 loaded casks shipped every week, then approximately 171 truck carrier round trips from the INEEL to WIPP and back could be made per year. The loading, and transport logic is presented as-follows:

- Load 18 casks/six trailers (duration one-week).
- Transport 18 casks/six trailers by commercial truck transport to WIPP (duration one-week).
- Unload 18 casks/six trailers at WIPP and pickup 18 casks/six trailers (duration one-week).
- Return 18 casks/six trailers via commercial truck transport to the INEEL (duration one-week).

Table C.6.2-85. Construction and operations project data for the Packaging and Loading Contact-Handled Transuranic Waste for Shipment to the Waste Isolation Pilot Plant (P112A).

Table C.6.2-86. Decontamination and decommissioning project data for the Packaging and Loading Contact-Handled Transuranic Waste for Shipment to the Waste Isolation Pilot Plant (P112A).

C.6.2.38 Calcine Packaging and Loading to Hanford (P117A)

GENERAL PROJECT OBJECTIVES: This project provides for the facility supporting the Minimum INEEL Processing Alternative, the Waste Packaging Facility (WPF). The Waste Packaging Facility would package unprocessed calcined solids and spent cesium-saturated resin into the 15-foot long "Hanford" canisters for shipment by dedicated rail to the Hanford Site for further processing.

PROCESS DESCRIPTION: The Waste Packaging Facility would start packaging calcine in 2012 and would complete the removal in 2025. Calcine would be retrieved from the storage bins on an as needed basis and collected in a dispensing vessel in the WPF. Calcine would be metered from the vessel into re-useable canisters. The calcine processing campaign is expected to take about 14 years. Intermittently, small amounts of spent, cesium-contaminated resin from the cesium extraction process in the SBW/Newly Generated Liquid Waste Facility would be transported to the dispensing vessels in the Waste Packaging Facility for loading into containers. The spent resin would be held in the Newly Generated Liquid Waste Facility until enough is available to fill a Hanford canister. Any decontamination solution or other liquid wastes generated in the Waste Packaging Facility would be collected in the process liquid hold tank would be sent to the SBW/ Newly Generated Liquid Waste Facility for treatment.

FACILITY DESCRIPTION: The Waste Packaging Facility would be designed to house the equipment and systems for packaging calcine and spent cesium contaminated resin into re-usable containers and for loading those containers into casks that are part of railcars used for transportation to the Hanford Site.

The Waste Packaging Facility process area would be a large cell housing the process equipment (i.e., the cyclone separators, dispensing vessel, sintered metal filters, pumps). Four cells would be arranged along the north wall of the basement area: a remote filter cell, a filter leaching cell, a decontamination cell, and a filter packaging cell. A cell housing the calcine transport air blowers and aftercoolers would be located along the west wall of the basement. The main operating floor and canister loadout area would be at grade level.

Table C.6.2-87. Construction and operations project data for Calcine Packaging and Loading to Hanford (P117A).

Table C.6.2-88. Decontamination and decommissioning project data for Calcine Packaging and Loading to Hanford (P117A).

C.6.2.39 Calcine Packaging and Loading to Hanford Just-in-Time (P117B)

GENERAL PROJECT OBJECTIVES: This project provides for the Waste Packaging Facility operating on a just-in-time schedule with the Hanford vitrification campaign under the Minimum INEEL Processing Alternative. The Waste Packaging Facility would package unprocessed calcined solids and spent cesium-saturated resin into canisters that are proposed for Hanford high level waste disposal and would prepare them for shipment by dedicated rail to the Hanford Site for further processing.

PROCESS DESCRIPTION: The Waste Packaging Facility would start packaging calcine in February 2028 and would complete the removal in March 2030. This just-in-time schedule would support the Hanford vitrification campaign schedule. In order to meet this schedule three identical processing lines and load-out bays would be required in the Waste Packaging Facility. Calcine would be retrieved from the INTEC bins on an as needed basis and collected in a dispensing vessel in the Waste Packaging Facility. Calcine would be metered from the vessel into the Hanford canisters. Intermittently, small amounts of spent, cesium-contaminated resin from the cesium extraction process in the SBW/Newly Generated Liquid Waste Facility would be transported to one of the Waste Packaging Facility dispensing vessels and metered into Hanford canisters. The spent resin would be generated starting in 2009 but would be held in the SBW/Newly Generated Liquid Waste Facility until enough is available to fill four canisters or one shipping cask's worth. All decontamination solution and other contaminated liquid wastes generated in the Waste Packaging Facility would be collected in the Waste Packaging Facility process liquid hold tank and sent to the SBW/Newly Generated Liquid Waste Facility for treatment.

This project includes the facilities and equipment for receiving and packaging the calcine and spent resin. Additionally, it includes the costs for the containers, casks, and railcars needed for shipment. It does not include the costs of the calcine retrieval system external to the Waste Packaging Facility, the rail spur, shipping to and unloading at Hanford, or the return of the railcar/cask assemblies to the INEEL.

FACILITY DESCRIPTION: The Waste Packaging Facility would be designed to house the equipment and systems for packaging calcine and spent cesium contaminated resin into re-usable containers and for loading those containers into casks that are part of railcars used for transportation to the Hanford Site.

The Waste Packaging Facility would consist of an upper and lower level and would house an empty canister storage area for eighty-eight canisters, an open area for the three canister loading ports leading to the below grade fill cells, and three separate but identical shielded calcine receiving/dispensing and filled canister transport cells. A separate room attached to the eastside of the upper level structure would contain the HEPA filters. Connected to the northwest side would be an open area with access to the remote HEPA filter train cells below. The administration area which would include the process control room and the electrical and mechanical areas would be located off the northwest corner of the upper level structure.

The lower level would consist of two sections. Located along the west wall would be the calcine transport air blower cell housing the calcine transport air blowers, water-cooled aftercoolers and balancing blowers. Four cells would be aligned along the north wall of this area; a remote HEPA filter train cell, a filter leach cell, a decontamination cell, and a filter packaging. Three separate fill cells with airlocks on either end for empty canister insertion and filled canister removal would occupy the rest of the area. The three cask/railcar assembly load-out bays would be located on the lower level.

Table C.6.2-89. Construction and operations project data for Calcine Packaging and Loading to Hanford Just-in-Time (P117B).

Table C.6.2-90. Decontamination and decommissioning project data for Calcine Packaging and Loading to Hanford Just-in-Time (P117B).

This page intentionally left blank.

C.6.2.40 Separations Organic Incinerator (P118)

GENERAL PROJECT OBJECTIVES: The project addresses the treatment of spent organic solvents that would be used in conjunction with the transuranic extraction, strontium extraction, and ion-exchange separation processes. The Separations Organic Incinerator would operate in support of the INTEC Waste Separations Facility or Transuranic Separations Facility.

The design and requirements of the Separations Organic Incinerator have not been finalized. It is assumed that the incinerator would control emissions without the addition of additional offgas control systems for NO_x, mercury, and dioxin.

PROCESS DESCRIPTION: The primary separation processes would be ion exchange and liquid-liquid extraction. Cesium would be removed by an ion exchange process. Actinides would be removed through the transuranic extraction liquid-liquid extraction process. Finally, strontium would be removed from the stream using the strontium extraction liquid-liquid process. Although each of these processes would recycle extraction solvents, they would become spent at some point in the process. At that time, solvent disposal is necessary. This project assumes that the solvents would be incinerated in the Separations Organic Incinerator.

FACILITY DESCRIPTION: The Separations Organic Incinerator would be made up of three sections, a combustion chamber, quench chamber, and an ash collection sump. The incinerator would be designed for four nine-day incineration campaigns per year. The normal feed rate would be 147 pounds per hour.

The feed would consist of a composition of the following:

- Two thousand gallons per year of transuranic separations spent solvent.
- Two thousand gallons per year of strontium extraction spent solvent.
- Fourteen thousand gallons per year of dodecane spent solvent.

Table C.6.2-91. Construction and operations project data for the Separations Organic Incinerator (P118).

Table C.6.2-92. Decontamination and decommissioning project data for the Separations Organic Incinerator (P118).

C.6.2.41 Waste Treatment Pilot Plant (P133)

GENERAL PROJECT OBJECTIVES: The proposed project would provide a pilot plant that would be used for process and equipment development testing. The facility would have both radioactive and non-radioactive testing areas for laboratory, bench, component, and integrated pilot scale tests. These tests would be required to study and identify the design parameters for the Waste Treatment Facility equipment and process. The Waste Treatment Facility would treat the high level radioactive waste at INTEC.

PROCESS DESCRIPTION: Waste Treatment Pilot Plant testing would include both radiologically hot and cold tests. Hot testing would be done at roughly 1/50 scale relative to the corresponding full-scale operations and would be expected to include the following:

- Bench scale testing of calcine dissolution processes.
- Bench scale integrated testing of the liquid-liquid separations process to extract fission products and actinides from dissolved radioactive calcines.
- Bench scale testing of ion-exchange extraction of cesium-137 from dissolved calcine
- Testing of filtration systems to separate undissolved solids from dissolved calcines
- Bench scale denitration and vitrification of high activity aqueous raffinates from separations
- Sample preparation and chemical/physical analysis of hot glass samples
- Sample preparation and chemical/physical analysis of glass frit/waste mixtures prior to vitrification

The sizes of the hot cells were selected by consideration of (a) the size of the hot cell currently being used for 1/50 scale testing of radioactive separations in the Radiological Analytical Laboratory at INTEC, (b) the size of the hot cell being used at Hanford for subscale vitrification testing, and (c) the size of analytical hot cells being used at the Savannah River Site to support the Defense Waste Processing Facility.

In addition to hot process testing described above, hot analytical cells would be included in the facility to allow wet chemistry, remoted analytical determinations (e.g., scanning electron microscopy, X-ray diffraction measurements, and inductively-coupled plasma/mass spectroscopy), and dilution and preparation of hot samples for glove box analytical procedures. The facility would also include ample glove box space to complement the hot analytical cells.

Cold pilot scale testing in the facility is expected to encompass the following:

- Integrated pilot scale testing of liquid-liquid separations of fission product and actinide simulants from cold calcines
- Scaleup testing of glass melters (hot melter testing is expected to be done at crucible scale, only)
- Integrated vitrification system pilot scale demonstration, including pretreatment of vitrification feeds from separations (i.e., evaporation and denitration) and offgas treatment
- Treating of offgas treatment systems for denitration, vitrification, and dissolution systems, including thermal quench, acid and/or caustic scrubbing, NOx reduction, mercury extraction, and HEPA filtration
- Production of cold calcine simulants for all calcine stored at INTEC
- Synthesis of cold simulants for high activity liquid wastes from separations for vitrification system development testing
- Cold pilot scale testing of calcine dissolution and undissolved solids filtration systems
- Cold testing of undissolved slurry handling/transport systems
- Mockup of full scale process equipment

Non-radioactive laboratory scale tests would also be performed to complement pilot scale testing. Laboratory testing would be done in the following areas:

- Materials testing/evaluation of coupons from pilot testing
- Stability (precipitation) testing of stored, concentrated waste solutions from separations
- Treatability tests for secondary waste streams (e.g., mercury)
- Laboratory tests to optimize extraction solvent compositions for separations
- Cold analytical procedures supporting pilot plant testing (e.g., leach testing of glass made from high activity separations effluent and of grouted waste from low activity separations effluent, sample analysis from offgas system testing, etc.)

Equipment that would be utilized in hot process cells would likely include subscale centrifugal liquid-liquid contactors, ion-exchange columns, calcine dissolution vessels (breakers/flasks), crucible furnaces, sintered metal filters, small-scale denitration equipment (kilns, fluidized beds), and equipment for sizing and dissolution of glass samples. Standard analytical equipment such as stirrers, crucible ovens, titrators, etc. would also be used.

Cold pilot facilities would include pilot scale centrifugal liquid-liquid contactors and ion-exchange columns, heated calcine dissolution tanks with mixing, subscale glass melters, sub- and full-scale sintered filters, and subscale rotary kilns and/or fluidized bed calciners. The 15-cm pilot plant for the INTEC New Waste Calcining Facility would be moved from CPP-637 to the Waste Treatment Pilot Plant to provide cold calcine simulants for used in pilot scale development/demonstration work. Tankage equipment would be used for makeup and storage of feedstocks for pilot scale processes, and full-scale process equipment mockups would be used for training, evaluation, and development of operating/maintenance procedures. Coring equipment for sampling and testing of grouted low activity waste would be used, and typical laboratory equipment would be installed and used in the cold laboratory space. Analytical equipment such as scanning/transmission electron microscope, optical microscopes, microprobes, X-ray diffractometers, viscometers, mass spectrometers, balances, gas analysis and particulate sizing equipment might also be used. All cold laboratories would include hood space with suitable air filtering/conditioning systems.

Cold pilot plant for separations and vitrification, and analytical hot cells would continue operation beyond full-scale startup to support waste processing operations in the Waste Treatment Facility.

FACILITY DESCRIPTION: The Waste Treatment Pilot Plant would be located in the northeast corner of INTEC, north of Palm Avenue and Hemlock Street. The ground floor footprint of the building would be approximately 34,500 feet^2. The main areas of the facility would consist of hot cells, crane bay, cold pilot plant, receiving and storage, and general support areas with office space and laboratories. Two floors above ground level would provide low-cost space for laboratories (8,800 feet^2) and mechanical/electrical equipment (5,000 feet^2). The crane bay (with 20-ton bridge crane) and crane maintenance areas (5,000 feet^2) above the hot cells would be arranged to provide removal of concrete hatchways allowing access to the hot cells below, and allowing maintenance and decontamination of large items exposed to the hot cell environments. The total floor space in the facility is anticipated to be not less than 58,000 feet^2.

Two types of hot cells (analytical cells and process cells) would be arranged in two parallel rows. The rows would be separated by a buffer area (with a 30-ton and 5-ton crane) and a decontamination cell. Each row of hot cells would have a manipulator running the entire length and eleven shield windows for viewing inside the cells (twenty-two shield windows in all). Twenty of the windows would each be equipped with a pair of manipulators, and the remaining two windows are to be used for operating the manipulators.

The facility would be all above grade with a minimum overall height of 58 feet plus the stack and would be divided into different building classifications by code to reduce construction costs. Construction types that would be employed would include shielded concrete, pre-cast concrete, pre-engineered metal building fabrications, and combinations thereof for cost containment.

Table C.6.2-93. Construction and operations project data for the Waste Treatment Pilot Plant (P133).

Table C.6.2-94. Decontamination and decommissioning project data for the Waste Treatment Pilot Plant (P133).

This page intentionally left blank.

Facility Disposition Projects

C.6.2.42 Bin Set 1 Performance-Based Closure (P1F)

GENERAL PROJECT OBJECTIVES: The proposed project defines and describes the activities that would be required for performance-based closure of the bin set 1 following the transfer of calcine from bin set 1 to bin set 7 (P1E). This includes the regulatory, compliance, and design requirements, cost estimates, and estimated schedules. Bin set 1 would then be filled with clean grout for stabilization purposes.

PHYSICAL DESCRIPTION: Bin set 1 consists of four sets of three concentric, stainless steel bins for a total of 12 bins. The storage capacity for bin set 1 is approximately 7,844 cubic feet. All of the bins are enclosed in a square concrete vault to provide secondary containment for the calcine. The vault for bin set 1 is buried 54.83 feet in the ground. The bins in bin set 1 are not anchored to the vault.

CLOSURE PROCESS DESCRIPTION

Performance-Based Closure of the Calcined Solids Storage Facilities would be expected upon completion of the following activities:

1. Filling the vault void to provide added structural rigidity to the bins and minimize the chance of subsidence within the Calcined Solids Storage Facilities over time. (Subsidence minimization is not a regulatory requirement but would be done as a best management practice.)

2. Decontaminating the interior surfaces of the piping, bins, vault (if necessary), and ancillary equipment.

3. Removing the residual calcine from the bins.

4. Sampling the calcine material in bin set 1.

5. Performing a risk analysis of the remaining bin contaminants.

6. Verifying that the risk to public health from the remaining bin residual contaminants, when combined with all other health risk sources at INTEC, is consistent with the cumulative risk assessment limits.

7. Filling the remaining bin voids with clean gout to solidify the remaining contaminants.

Performance-based closure would involve the use of robotics (snake-like crawler robots, tractor/vacuum robots, and light duty utility arms), existing retrieval equipment, and carbon dioxide blasting to clean the bottoms of the bins, as well as the ledges and pipe supports. Robots would be used due to the high radiation fields expected in the bins, as they could be deployed and operated remotely through the use of controllers and camera systems. Carbon dioxide blasting would be used for decontamination purposes because it is more effective than other decontamination methods, it minimizes the generation of secondary waste, and it would not adversely affect the bin surfaces.

Table C.6.2-95. Decontamination and decommissioning project data for the Performance-Based Clean Closure with Subsequent Clean Fill of Bin Set 1 in the Calcined Solids Storage Facility (P1F).

This page intentionally left blank.

C.6.2.43 Performance-Based Closure with Subsequent Clean Fill of the Tank Farm Facility (P3B)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide for the Resource Conservation and Recovery Act (RCRA) performance-based closure of the 11 stainless steel tanks contained within the Tank Farm Facility. The Tank Farm Facility currently stores High-Level Liquid Waste and sodium-bearing liquid waste. Closure activities would begin once usage of a tank or tanks ceases. Each tank and vault would be filled with clean grout as part of the closure process. Existing operations would remove the liquid waste (except for the heel) from the Tank Farm Facility.

PROCESS DESCRIPTION: Each individual tank system would be isolated from the rest of the Tank Farm by cutting, grouting (as applicable), and capping the ancillary piping. Tank and vault wall contamination residue would be washed into the heel using water or decon solution. The residual heel material in the tanks and vaults would then be stabilized. The stabilization process would include washing, flushing, pumping, pH adjustment, heel displacement, and free liquid elimination.

A material sampling and risk analysis of the remaining tank heel and vault contaminants would be performed. The analysis would have to verify that the risk to public health from the remaining Tank Farm residual heels meets the Closure Plan performance criteria and the total Tank Farm Facility closure risk, when combined with all other health risk sources at the INTEC, would be consistent with the cumulative risk assessment limits for the INTEC.

The vault void (the space between the tanks and the surrounding concrete structure) would be filled with clean grout. The tank and vault voids would be filled with clean grout to provide added structural rigidity to the tanks and minimize the chance of subsidence over time.

The closure method presented in the study would involve using heel characterization equipment, liquid removal, tank and vault washing systems, and grout placement systems to close each tank.

FACILITY DESCRIPTION: The Tank Farm Facility is used to temporarily store mixed waste until the waste is converted into a solid form at the New Waste Calcining Facility. The Tank Farm Facility consists of mixed waste underground storage tanks, tank vaults, interconnecting waste transfer lines, valve boxes, valves, airlift pit, cooling equipment, and several small buildings containing instrumentation and valving for the waste tanks. The closure study focuses on closing the nine 300,000-gallon (1,135,624-liter) and two 318,000-gallon (1,203,761-liter) stainless steel storage tanks (WM-182 through WM-190, and WM-180 plus WM-181, respectively) and associated Tank Farm Facility item. All 11 storage tanks are cylindrical in shape with a dome on top and a flat bottom. Each tank is contained in an underground, unlined concrete vault.

Liquid waste enters the tanks via a process waste feed line. Waste is removed using a steam-jet system that uses steam to lift the waste out of the tank. The waste can be directed to a specific tank via various approved valving arrangements. The waste can be placed or removed from any tank and placed into another tank or processing facility depending on the valve configuration and the desired end location.

Table C.6.2-96. Decontamination and decommissioning project data for Closure of the Tank Farm – Performance-Based Clean Closure with Clean Fill (P3B).

This page intentionally left blank.

C.6.2.44 Tank Farm Closure to RCRA Landfill Standards (P3C)

GENERAL PROJECT OBJECTIVES: The proposed project defines and describes the activities that would be required to close eleven 300,000-gallon tanks contained within the Tank Farm to landfill standards. This would include the major regulatory, compliance, and design requirements, cost estimates, and estimated schedules. Closure to landfill standards activities would begin once cease use of a Tank Farm tank or tanks occur. Each Tank Farm tank and vault void would be filled with clean grout as part of the closure process. Filling both tank and vault voids would prevent future ground subsidences from occurring within the Tank Farm.

PHYSICAL DESCRIPTION: The Tank Farm is used to store mixed waste until the waste is converted into a solid form at the New Waste Calcining Facility. The Tank Farm consists of mixed waste underground storage tanks, tank vaults, interconnecting waste transfer lines, valve boxes, valves, airlift pit, cooling equipment, and several small buildings containing instrumentation and valving for the waste tanks. The closure would focus on closing the nine 300,000-gallon (1,135,624-liter) and two 318,000-gallon (1,203,761-liter) stainless steel storage tanks (WM-182 through WM-190 and WM-180 plus WM-181, respectively) and associated Tank Farm items. All 11 storage tanks are cylindrical in shape with a dome on top and a flat bottom. Each tank is contained in an underground, unlined concrete vault.

Liquid waste enters the tanks via a process waste feed line. Waste is removed using a steam-jet system that uses steam to lift the waste out of the tank. The waste can be directed to a specific tank via various approved valving arrangements. The waste can be removed from any tank and placed into another tank or processing facility depending on the valve configuration and the desired end location.

CLOSURE PROCESS DESCRIPTION: Closure to landfill standards/clean fill of the Tank Farm would be expected upon completion of the following activities:

1. Leaving the tanks, vaults, and piping in place. This would include isolating each individual tank system from the rest of the Tank Farm by cutting, grouting (as applicable), and capping the ancillary piping.

2. Washing the bulk of the tank wall contamination residue into the heel using water (once only).

3. Stabilizing the residual heel material in the tank bottoms. (Heel stabilization would include washing, flushing, pumping, pH adjustment, heel displacement, and free liquid elimination.)

4. Filling the tank and vault voids with clean grout. (Excavation would be required to create additional access risers into each vault. The excavated soils would be used to back fill against the risers. The soil displaced by the access riser (approximately 0.25 m^3 per riser) would be sent to a CERCLA soils repository.)

The closure to landfill standards method would involve using heel characterization equipment, liquid removal and agitation pumps, tank washing systems, and wet and dry grout placement systems to close each tank.

It is assumed that the closure to landfill standards cleaning efforts would be directed at removing as much residual waste from the tanks as possible without going to the level of cleanliness required by performance-based clean closure. To accomplish this, the cleaning effort would be directed at washing the tank wall once then removing as much waste residue as possible during the pH adjustment portion of heel stabilization.

Table C.6.2-97. Decontamination and decommissioning project data for Tank Farm Closure to RCRA Landfill Standards (P3C).

This page intentionally left blank.

C.6.2.45 Performance-Based Closure with Class A Grout Placement in Tank Farm Facility and Calcined Solids Storage Facility (P26)

GENERAL PROJECT OBJECTIVE: The general objective of this project is to provide for the Resource Conservation Recovery Act (RCRA) performance-based closure of the Tank Farm Facility and the Calcined Solids Storage Facility (CSSF) and subsequent disposal of Class A Low-Level Waste grout in these facilities. The Tank Farm Facility currently stores High-Level Liquid Waste and sodium-bearing liquid waste (SBW). The Calcined Solids Storage Facility stores High-Level Waste calcined solids resulting from the calcination of liquid waste. Other projects would remove the liquid waste or calcine (except for the heel) from these facilities.

PROCESS DESCRIPTIONS: During the performance-based closure phase, the facilities would be decontaminated to the maximum extent that is technically and economically practical. For the Tank Farm, the tanks and vaults would be washed and the resulting liquid pumped out to remove the majority of the heel waste residues. The remaining liquid heel would be solidified using clean grout. The ancillary piping, such as waste transfer lines, would be flushed and grouted with clean grout. Afterwards, the vaults would be completely filled with clean grout to prevent the intrusion of liquid and to act as a temporary cover or cap over the tank. When pouring is complete the 11 tanks and the sand under 9 of the 11 tanks would be encapsulated between the newly poured grout and the vault floor.

A similar closure approach is proposed for the CSSF. The interior surfaces of the CSSF bins, piping, and ancillary equipment would be decontaminated, again to the maximum extent that is technically and economically practical. It is assumed, for this project, that the bins will be sufficiently decontaminated such that performance criteria would be met. The vault void (the space between the bins and the surrounding concrete structure) would be filled with clean grout to provide added structural rigidity to the bins and minimize the chance of subsidence within the CSSF over time.

After the Tank Farm and the CSSF have been closed, they would be used as low-level waste disposal facilities. The tank and bin voids would be filled with Class A grout that would be produced at the Class A Grout Plant and delivered to the Tank Farm and CSSF in shielded piping.

FACILITY DESCRIPTIONS: The Tank Farm consists of underground storage tanks, tank vaults, interconnecting waste transfer lines, valve boxes, valves, airlift pits, cooling equipment, and several small buildings that contain instrumentation and valving for the waste tanks. The eleven stainless steel tanks are contained in underground, unlined concrete vaults and are used to store mixed liquid wastes. Liquid waste is transferred throughout the Tank Farm in underground, stainless steel lines. The liquid waste that remains after the tanks have been emptied as low as possible with the steam jets and airlifts is referred to as a “heel.” The heels are expected to range in volume from 5,000 to 15,000 gallons when cease use occurs. During HLW processing, grout would be pumped, at intervals, from the Class A Grout Plant to the Tank Farm in shielded lines.

The CSSF contains seven bin sets, with each bin set containing multiple bins used for calcine storage. Each set of bins is arranged inside a concrete structure called a vault. The bins themselves are large vertical cylinders constructed of stainless steel. The grout would be pumped to the CSSF using the same systems as in the Tank Farm.

Please see Project 26 under “Waste Processing Projects” for project data tables.

C.6.2.46 Performance-Based Closure and Class C Grout Disposal in Tank Farm & CSSF (P51)

GENERAL PROJECT OBJECTIVE: The Tank Farm Facility currently stores High-Level Liquid Waste and sodium-bearing liquid waste (SBW). The Calcined Solids Storage Facility (CSSF) stores HLW calcined solids resulting from the calcination of liquid waste. Other projects would remove the liquid waste or calcine (except for the heel) from these facilities. This project provides for the Resource Conservation Recovery Act (RCRA) performance-based closure of the Tank Farm and CSSF and subsequent disposal of Class C low-level waste grout in these facilities. RCRA would no longer regulate either facility once the performance criteria have been achieved. This allows other uses for the remaining void spaces.

This project assumes that the facilities would be decontaminated to the maximum extent that is technically and economically practical. It is further assumed that the residual levels of contamination would meet the performance requirements for Performance-Based Closure under RCRA. Meeting the performance criteria means:

1. The waste has been removed from the tank system, and

2. The contamination remaining in a tank or bin is within an acceptable risk level to the public or environment and is consistent with the remediation goals for the INTEC.

After the facilities are closed, it is proposed that they then be used as low-level waste disposal facilities to receive the grout generated by the separations process.

FACILITY DESCRIPTIONS: The Tank Farm consists of underground storage tanks, tank vaults, interconnecting waste transfer lines, valve boxes, valves, airlift pits, cooling equipment, and several small buildings that contain instrumentation and valving for the waste tanks. The eleven stainless steel 300,000 to 318,000-gallon tanks (hereafter referred to as 300,000-gallon tanks) are contained in underground, unlined concrete vaults. The tanks have a 50-foot diameter and an overall height of approximately 30 feet (includes the dome height). The vault floors are approximately 45 feet below grade level and are patterned after three basic designs: cast-in-place octagonal vaults, pillar-and-panel style octagonal vaults, or cast-in-place square 4-pack configuration. A thin sand layer was placed between the vault floor and tank on nine of the eleven tanks. To protect personnel from radiation, the concrete vault roofs are covered with approximately 10 feet of soil.

The 300,000-gallon tanks are used to store mixed liquid wastes. Eight of the eleven 300,000-gallon tanks contain stainless steel cooling coils, which are located on the tank walls and floors. These cooling coils were used, as required, to maintain the liquid waste below predetermined temperatures in order to minimize corrosion of the stainless steel tanks.

Liquid waste is transferred throughout the Tank Farm in underground, stainless steel lines. The stainless steel lines are housed in stainless steel-lined concrete troughs or double-walled stainless steel pipe. The waste is transferred using steam jets or airlifts. Generally, the intakes are located 4 to 12 inches above the tank floor, which limits the amount of liquid waste that can be removed from the tanks. The liquid waste that remains after the tanks have been emptied as low as possible with the steam jets and airlifts is referred to as a “heel.” The heels are expected to range in volume from 5,000 to 15,000 gallons when cease use occurs.

The systems used for closure will involve remotely operated equipment to wash down the tanks, remove the heel to the extent possible, solidify the remaining heel, and fill the vault with clean grout. During the processing of the HLW in the Class C Grout Plant, LLW grout will be pumped, at intervals, from the Class C Grout Plant to the Tank Farm in shielded lines.

The CSSF contains seven bin sets, with each bin set containing multiple bins used for calcine storage. Each set of bins is arranged inside a concrete structure called a vault. The bins themselves are large vertical cylinders constructed of stainless steel. Bin set 1, the first constructed, is much smaller than the other six. In bin set 1, the bins vary in diameter from 3 feet to 12 feet, and in length from 20 feet to 24 feet. The bins in the rest of the bin sets are 12 feet to 13.5 feet in diameter and from 40 feet to almost 70 feet in length. The bins (with the exception of those in Bin set 1) are equipped with retrieval risers or pipes that connect to the surface. These risers will be used during calcine retrieval operations. New risers will be installed on the bins contained in bin set 1 during the calcine retrieval activities. The vaults for bin sets 2 through 7 are hollow cylinders, with inside diameters of 40 feet to 60 feet, and a wall thickness of 2 to 4 feet. The vault for bin set 1 is a square design, with walls about 2.5 feet thick.

The systems used for closure of the bin sets will include remotely operated drilling and cutting equipment, remotely operated carbon dioxide pellet blasting systems, remotely operated robots for cleaning the interior surfaces of the bins, and equipment for filling the lines and vaults with clean grout.

The grout would be pumped to the CSSF using the same systems as in the Tank Farm.

PROCESS DESCRIPTION: The processes considered in this project are best described in two phases:

- Closure of the facilities as required for a RCRA interim status facility, and
- Subsequent use of the remaining tank and bin voids as a low-level landfill.

RCRA CLOSURE: During the closure phase, the facilities would be decontaminated to the maximum extent that is technically and economically practical. For the Tank Farm, the tanks and vaults would be washed and the resulting liquid pumped out to remove the majority of the heel waste residues. The remaining liquid heel would be solidified using clean grout. The ancillary piping, such as waste transfer lines, would be flushed and grouted with clean grout. Tank leak monitoring lances would then be installed in four equally spaced locations inside the vaults. Afterwards, the vaults would be completely filled with clean grout to prevent the intrusion of liquid and to act as a temporary cover or cap over the tank. When pouring is complete, the 11 tanks, and the sand under nine of the 11 tanks, would be encapsulated between the newly poured grout and the vault floor.

A similar closure approach is proposed for the CSSF. The interior surfaces of the CSSF bins, piping, and ancillary equipment would be decontaminated, again to the maximum extent that is technically and economically practical. It is proposed that decontamination be accomplished by blasting the contaminated surfaces with carbon dioxide pellets to minimize the generation of any secondary waste and maintain the structural integrity of the bins. This blasting process would dislodge the residual calcine remaining on the bin walls and floors. This dislodged calcine would then be removed from the bins using robots and the calcine removal equipment previously installed to remove the calcine.

It is assumed, for this project, that the bins would be sufficiently decontaminated such that performance criteria would be met. The vault void (the space between the bins and the surrounding concrete structure) would be filled with clean grout to provide added structural rigidity to the bins and minimize the chance of subsidence within the CSSF over time.

SUBSEQUENT USE: After the Tank Farm and the CSSF have been closed, they would be used as low-level waste landfills. The tank and bin voids would be filled with Class C grout that is produced at the Class C Grout Plant and delivered to the Tank Farm and CSSF in shielded piping.

Please see Project 51 tables under the “Waste Processing Projects” for project data information.

This page intentionally left blank.

C.6.2.47 Performance-Based Clean Closure of the Calcined Solids Storage Facility (P59C)

GENERAL PROJECT OBJECTIVE: The project defines and describes the activities required for performance-based closure of the Calcined Solids Storage Facility (CSSF) following the end of use of the bins within a given bin set. The bins comprising the bin set would then be filled with clean grout for stabilization purposes.

PHYSICAL DESCRIPTION: The Calcined Solids Storage Facility consists of seven bin sets, each bin set contains from three to twelve bins. A bin is a single, stainless steel, vertical vessel that holds, or will hold, processed calcine for long-term storage. Three different bin types have been installed in the Calcined Solids Storage Facility. Bin set 1, the pilot-scale bin set, contains four main bins, each main bin consisting of three individual, concentric shells. The storage capacity for bin set 1 is approximately 7,844 cubic feet. Bin sets 2-4 are comprised of cylindrical bins (total storage capacity of 17,895 to 40,686 cubic feet). Bins sets 5-8 are composed of annular bins resembling a donut (total storage capacity of 36,544 to 64,778 cubic feet).

All of the bins within a given bin set are enclosed in a concrete vault (cylindrical or square) to provide secondary containment for the calcine. The vaults have all been buried, the depth varying from one bin set to the next. The bins in bin sets 2-7 are anchored to the vault by means of a metal skirt welded to the bin bottom and bolted to the vault floor. The bins in bin set 1 are not anchored to the vault.

Calcine enters each bin set via a main feed line. This line then enters a distributor, which routes the calcine to the individual bins. The distributor piping does not contain any control valves, thus the flow of calcine cannot be directed into a specific bin within a bin set.

CLOSURE PROCESS DESCRIPTION: Performance-based closure/clean fill of the Calcined Solids Storage Facility would be expected upon completion of the following activities:

1. Filling the vault void to provide added structural rigidity to the bins and minimize the chance of subsidence within the Calcined Solids Storage Facility over time.

2. Decontaminating the interior surfaces of the Calcined Solids Storage Facility piping, bins, vaults (if necessary), and ancillary equipment.

3. Removing the residual calcine from the bins.

4. Performing a material sampling and risk analysis of the remaining bin contaminants.

5. Verifying that the risk to public from the remaining bin residual contaminants, when combined with all other health risk sources at the INTEC, is consistent with the cumulative risk assessment limits for the INTEC.

6. Filling the remaining bin voids with clean grout to solidify the remaining contaminants.

This method of closure would involve the use of robotics, existing retrieval equipment, and carbon dioxide blasting to clean the bottom of the bins, as well as the ledges and pipe supports. Robots would be used due to the high radiation fields expected in the bins, as they could be deployed and operated remotely through the use of controllers and camera systems.

Table C.6.2-98. Decontamination and decommissioning project data for the Performance-Based Clean Closure of the Calcined Solids Storage Facility (P59C).

This page intentionally left blank.

C.6.2.48 Closure to Landfill Standards with Subsequent Clean Fill of the Calcined Solids Storage Facility (P59D)

GENERAL PROJECT OBJECTIVES: The proposed project defines and describes the activities which would be required to close the Calcined Storage Facility (CSSF) to landfill standards when use of the bins within a given bin set ceases. This includes the major regulatory, compliance, and design requirements, cost estimates, and estimated schedules. The bins comprising the bin set would then be filled with clean grout for stabilization purposes.

PHYSICAL DESCRIPTION: The Calcined Solids Storage Facilities consist of seven bin sets, each bin set containing from three to twelve bins. A bin is a single, stainless steel, vertical vessel that holds, or would hold, processed calcine for long-term storage. Three different bin types have been installed in the CSSF. Bin set 1, the pilot-scale bin set, contains four main bins, each main bin consisting of three individual, concentric shells. The storage capacity for bin set 1 is approximately 7,844 cubic feet. Bin sets 2–4 are comprised of cylindrical bins (total storage capacity of 17,895 to 40,686 cubic feet). Bin sets 5–8 are composed of annular bins resembling a donut (total storage capacity of 36,544 to 64,778 cubic feet).

All of the bins within a given bin set are enclosed in a concrete vault (square cylindrical or) to provide secondary containment for the calcine. The vaults have all been buried, the depth varying from one bin set to the next. The bins in bin sets 2–7 are anchored to the vault by means of a metal skirt welded to the bin bottom and bolted to the vault floor. The bins in bin set 1 are not anchored to the vault.

Calcine enters each bin set via a main feed line. This line then enters a distributor, which routes the calcine to the individual bins. The distributor piping does not contain any control valves, thus the flow of calcine cannot be directed into a specific bin within a bin set. All bins within the bin set are filled at the same time.

CLOSURE PROCESS DESCRIPTION:

Closure to Landfill Standards with subsequent Clean Fill of the Calcined Solids Storage Facility would be expected upon completion of the following activities:

1. Leaving the bins, vaults, and piping in place. This would include isolating each individual bin system from the rest of the Calcined Solids Storage Facility by cutting, grouting (as applicable), and capping the ancillary piping.

2. Filling the vault void with grout to provide a cap. This temporary cap would minimize subsidence within the Calcined Solids Storage Facility. (Subsidence minimization is not a regulatory requirement, but would be done as a Best Management Practice.)

3. Managing the residual waste material in the bin bottoms. Residue management would include partial removal of the contaminants, decontamination, and residue solidification using clean grout.

4. Making provisions for a landfill monitoring system.

5. Filling the remaining bin voids with clean grout to solidify the remaining contaminants.

6. The method of closure would involve the use of robotics (tractor/vacuum robots), in conjunction with the existing retrieval equipment, to clean the floor of the bins after the vault void had been grouted. Robots would be used due to the high radiation fields expected in the bins, as they can be deployed and operated remotely through the use of controllers and camera systems.

7. The cleaning efforts during Closure to Landfill Standards would be directed at removing as much residual calcine from the bins as possible without going to the level of cleanliness required by Performance-Based Clean Closure. To accomplish this, the cleaning efforts would be directed at removing the calcine from the floors, as this is where the majority of the calcine would be expected. The ledges and interior surfaces of the walls would not be expected to be cleaned under this scenario, as they would be expected to have minimal contamination.

8. The bin voids would then be grouted with clean grout to solidify the remaining contaminants.

Table C.6.2-99. Decontamination and decommissioning project data for the Closure of the Calcined Solids Storage Facility to Landfill Standards with Subsequent Clean Fill (P59D).

This page intentionally left blank.

C.6.2.49 Clean Closure to Detection Limits of the Calcined Solids Storage Facility (P59F)

GENERAL PROJECT OBJECTIVES: The Calcined Solids Storage Facility (CSSF), or bin sets, stores high-level waste calcined solids resulting from the calcination of liquid waste. This project provides for the Resource Conservation Recovery Act (RCRA) clean closure of the Calcined Solids Storage Facility. This closure method removes the hazardous and radioactive wastes still contained inside each bin down to detection limits, demolishes the remaining concrete vault structures to grade level, and fills any remaining vault voids. Long-term monitoring would not be required since the facility would be clean closed and would no longer pose a threat to human health or the environment. Other projects would remove the liquid waste or calcine (except for the heel) from these facilities.

PROCESS DESCRIPTION: The project processes are best described in the following steps:

1. Cleaning the facility to the levels identified in EDF-PDS-B-002 (P51),
2. Remotely removing the vault roof,
3. Remotely removing each bin from the vault and transporting the bin to the debris treatment facility built as part of this project to handle each bin,
4. Remotely dismantling, decontaminating, and disposing of the bins, and
5. Demolishing the remaining reinforced concrete vaults to grade level and filling each vault with clean fill.

The Calcined Solids Storage Facility would be closed to clean standards once the above steps were completed. No additional regulatory oversight would be required for the closed area. Final stages of the process would include construction of a new low-level waste storage landfill as well as dismantling and removal of the new debris treatment facility.

FACILITY DESCRIPTION:

The Calcined Solids Storage Facility contains seven bin sets, with each bin set containing multiple bins used for calcine storage. Each set of bins is arranged inside a concrete structure called a vault. The bins themselves are large vertical cylinders constructed of stainless steel. Bin set 1, the first constructed, is much smaller than the other six. The bins (with the exception of those in bin set 1) are equipped with retrieval risers or pipes that connect to the surface. These risers would be used during calcine retrieval operations. New risers would be installed on the bins contained in bin set 1 during the calcine retrieval activities. The vaults for bin sets 2 through 7 are hollow cylinders, with inside diameters of 40 feet to 60 feet, and a wall thickness of 2 feet to 4 feet. The vault for bin set 1 is a square design, with walls about 2.5 feet thick.

The systems used for clean closure of each bin set would include:

1. Remotely operated drilling and cutting equipment,

2. Remotely operated carbon dioxide pellet blasting systems,

3. Remotely operated robots for cleaning the interior surfaces of the bins,

4. Remotely operated equipment for removing the vault roof and disconnecting each bin from the other bins contained in the vault, and

5. Equipment for removal and transport of bins to a new Debris Treatment facility (also referred to as the Bin Cutting facility).

Table C.6.2-100. Decontamination and decommissioning project data for the Clean Closure to Detection Limits of the Calcined Solids Storage Facility (P59F).

This page intentionally left blank.

C.6.2.50 Total Removal Clean Closure of the Tank Farm Facility (P59G)

GENERAL PROJECT OBJECTIVE: The proposed project defines and describes the activities required for the total removal clean close of the eleven 300,000-gallon tanks contained within the Tank Farm Facility. This includes the major regulatory, compliance, and design requirements, cost estimates, and estimated schedules. Clean closure activities would begin once cease use of a Tank Farm tank or tanks occurs. Total removal of the wastes, tanks, vaults, ancillary piping, and contaminated soils are part of the closure process.

PHYSICAL DESCRIPTION: The Tank Farm consists of mixed waste underground storage tanks, tank vaults, interconnecting waste transfer lines, valve boxes, valves, airlift pit, cooling equipment, and several small buildings containing instrumentation and valving for the waste tanks. The closure study focuses on closing the nine 300,000-gallon (1,135,624-liter) and two 318,000-gallon (1,203,761-liter) stainless steel storage tanks (WM-182 through WM-190 and WM-180 plus WM-181, respectively) and associated Tank Farm items. Each tank is contained in an underground, unlined concrete vault.

A Debris Cleaning Facility would be constructed for processing the removed equipment, tanks, and vaults. The facility will be used for cleaning and sizing debris. This facility would have extensive contamination controls to reduce air emissions: A vacuum system attached to the carbon dioxide blasting system. Both the vacuum system and cell ventilation system will have a cyclone, sintered metal filter, and two HEPA filters to remove airborne contamination.

A Low Level Waste Disposal site, which meets RCRA Subtitle D landfill requirements, would be built for the Tank Farm waste.

CLOSURE PROCESS DESCRIPTION: The Clean closure method requires the removal of all waste residues and the decontamination of equipment and structures to be left in place. The waste and equipment removed must be managed properly. This process provides for the complete removal of contaminated Tank Farm components including tanks, vaults, piping, and valve boxes. Following removal, these contaminated components are treated and disposed of in accordance with Land Disposal Restrictions.

Table C.6.2-101. Decontamination and decommissioning project data for the Total Removal Clean Closure of the Tank Farm Facility (P59G).

C.6.2.51 Closure to Landfill Standards of the Process Equipment Waste Condensate Lines (P154A, B)

GENERAL PROJECT OBJECTIVE: The proposed project defines and describes the activities required for the deactivation and demolition of the Process Equipment Waste Condensate Lines.

PHYSICAL DESCRIPTION: This project addresses two transfer lines:

- Process Equipment Waste and Cell Floor Drain Lines (154A)
- Process Equipment Waste Condensate Lines (P154B)

The transport lines are used to transport waste and condensate from the process facility to the treatment or storage facility.

Process Equipment Waste and Cell Floor Drain Lines (P154A):

The original lines between INTEC-601 and –604 were replaced about 1982 (at the same time the high-level liquid waste lines were replaced). The lines were capped and abandoned in place and may have several places where they were cut and capped. Each 3-inch diameter stainless steel pipeline was surrounded with a 6-inch diameter tile pipe which was encased in concrete. The lines are between 6 and 12 feet below ground. The total linear footage is approximately 700 feet. The capping effort would require 6 caps per line (18 capping points).

Two 3-inch diameter stainless steel pipelines replaced the original lines. The new lines are encased in 4-inch stainless steel pipe, which is buried directly in the ground (approximately 6 to 12 feet deep). The lines are approximately 300 feet long. The lines will be capped and abandoned in place. The capping effort would require 2 caps total for both lines.

Process Equipment Waste Condensate Lines (P154B):

Above ground: The new Process Equipment Waste Condensate Discharge Line runs from CPP-601 to CPP-605. This project considers the outdoors portion of the line. A portion of the line runs over CPP-649 and CPP-604. The line is approximately 300 feet in length and consists of a 2-inch pipe contained in a 4-inch insulated pipe. Seven support stanchions support the line. The landfill closure requires the line to be capped and abandoned in place. However, since the line is above ground, the line would be completely removed. There is 50 feet of this piping run that is underground. It must be capped on each end.

Below ground: The old Process Equipment Waste Condensate Discharge Line runs from CPP-601 to CPP-605. The line is approximately 1,200 feet in length and consists of a 2-inch to 3-inch diameter that was buried directly in the ground at a depth of between 6 to 12 feet. The performance-based closure requires the line to be flushed, capped, and abandoned in place. Since the line has been cut in a number of places over the years to make way for new facility piping, the line must be capped in 8 places.

Table C.6.2-102. Decontamination and decommissioning project data for the PEW and Cell Floor Lines (P154A).

Table C.6.2-103. Decontamination and decommissioning project data for the PEW Condensate Lines (P154B).

C.6.2.52 Tank Farm Complex Closure (P156B-F, G, L)

GENERAL PROJECT OBJECTIVES: The project included activities that would be associated with the deactivation and demolition of the Tank Farm Complex.

PROCESS DESCRIPTION: The complex is currently undergoing deactivation and is targeted for a "land-fill" closure, except for the Waste Holdup Pumphouse (CPP-641) which would be clean closed. The below ground levels of the complex would be demolished in place and covered with an earthen cap. The ridged asbestos siding and roofing would be removed and either placed in the below ground areas of the existing building prior to grouting or placed in a land-fill approved for asbestos disposal.

The Tank Farm Complex facilities scheduled for deactivation and demolition include:

	Complete	
Facility	Deactivate	D&D
CPP-619: Tank Farm Area-CPP (Waste Storage Control House) (P156B)	2015	2023
CPP-628: Tank Farm Area-CPP (Waste Storage Control House) (P156C)	2015	2023
CPP-634: Tank Farm Area (Waste Storage Pipe Manifold Building) (P156D)	2015	2023
CPP-638: Waste Station (WM-180) Tank Transfer Building (P156E)	2012	2015
CPP-641: Waste Holdup Pumphouse (P156L)	2012	2015
CPP-712: Instrument House (VES-WM-180, 181) (P156F)	2015	2023
CPP-717: STR Waste Storage Tanks (WM-103, 104, 105, 106) (P156G)	2015	2023

COMPLEX DESCRIPTION: The total multi-level building area of the complex is approximately 4,699 feet^2.

The Tank Farm Area-CPP (Waste Storage Control House) (CPP-619) houses the computer that receives data transmitted by radio frequency probes on the levels in the big tanks of the Tank Farm. The Waste Storage Control House is a one-story, 416 square-foot masonry-exterior building. The building is rated as a low-hazard facility.

The Tank Farm Area-CPP (Waste Storage Control House) (CPP-628) houses the pneumatic instrument readouts for the big tanks in the Tank Farm. The CPP-628 Tank Farm Area-CPP (Waste Storage Control House) is a one-story, 1,562 square-foot masonry-exterior building. It was built in 1953 as a Tank Farm control house. The building is rated as a high-hazard facility. High levels of radiation are present in the northeast corner around the jet. Low levels of hazardous chemical contamination exist due to a leaky chromate water system. Low quantities of asbestos exist in the piping insulation.

The Tank Farm Area (Waste Storage Pipe Manifold Building) (CPP-634) is one of the primary locations of the Tank Farm's cooling system valves. The CPP-634 Tank Farm Area (Waste Storage Pipe Manifold Building) is a one-story, 231 square-foot masonry-exterior building. It was built in 1958 to house the valves for the water cooling system in the Tank Farm. The building is rated as a low-hazard facility. Low quantities of asbestos contamination are present in the piping insulation.

The Waste Station (WM-180) Tank Transfer Building (CPP-638) houses the valves and controls of the offgascondenser system. The CPP-638 Waste Station (WM-180) Tank Transfer Building is a one-story, 87 square-foot masonry-exterior building. The building is rated as a medium-hazard, medium-radiation facility. Medium quantities of asbestos are located in the transite and piping insulation.

The Waste Holdup Pumphouse (CPP-641) houses the monitoring systems for the WL-103, WL-104, WL-105 tanks. These tanks receive waste from laboratories in the INTEC-637 Process Improvement Low Bay, but the laboratories do not currently generate waste; therefore, the tanks are inactive. The CPP-641 Waste Holdup Pumphouse is a 442 square-foot, one-story, masonry-exterior building. The building is rated as a medium-hazard-facility, medium-radiation facility. Medium quantities of asbestos are located in the transite insulation.

The CPP-712 Instrument House (VES-WM-180, 181) is a 216 square-foot concrete block building. It is rated as a low-hazardous, low-radiation facility.

The CPP-717 STR Waste Storage Tanks (WM-103, 104, 105, 106) are four 30,200 gallon tanks buried approximately 15 feet below grade. The tanks set on 12-inch thick concrete pads. The tanks are rated low radiation.

Table C.6.2-104. Decontamination and decommissioning project data for the Waste Storage Control House (P156B).

Table C.6.2-105. Decontamination and decommissioning project data for the Waste Storage Control House (P156C).

Table C.6.2-106. Decontamination and decommissioning project data for the Waste Storage Pipe Manifold Building (P156D).

Table C.6.2-107. Decontamination and decommissioning project data for the Waste Station (WM-180) Tank Transfer Building (P156E).

Table C.6.2-108. Decontamination and decommissioning project data for the Instrument House (P156F).

Table C.6.2-109. Decontamination and decommissioning project data for the Closure of STR-Waste Storage Tank (WM-103, 104, 105, 106) – CPP 717 to Landfill Standards (P156G).

Table C.6.2-110. Decontamination and decommissioning project data for the West Side Waste Holdup (P156L).

This page intentionally left blank.

C.6.2.53 Facility Closure of the Bin Set Group (P157A-F)

GENERAL PROJECT OBJECTIVES: The project included activities that would be associated with the deactivation and demolition of the bin set complex.

PROCESS DESCRIPTION: Deactivation of the complex would be scheduled for completion in 2037. Demolition would be scheduled to start in 2038 and would be completed in 2043.

The project addresses these facilities:

- CPP-639: Instrumentation Building for bin set 1 (P157A)
- CPP-646: Instrument Building for 2nd Set of Calcined Solids (P157B)
- CPP-647: Instrument Building for 3rd Set of Calcined Solids (P157C)
- CPP-658: Instrument Building for 4th Set of Calcined Storage (P157D)
- CPP-671: Instrument Building for 5th Set of Calcined Storage (P157E)
- CPP-673: Service Building for 6th Set Calcined Solids (P157F)

COMPLEX DESCRIPTION: The INTEC bin set buildings house the instrumentation to monitor the bid sets. The total multi-level building area of the complex is approximately 1,131 feet^2. The complex is currently undergoing deactivation and would be targeted for a landfill closure. The above ground portion of the complex would be demolished in place and covered with an earthen cap.

The CPP-639 Instrumentation Building for bin set 1 is a one-story, 372 feet^2 masonry-exterior building. The building houses instrumentation to monitor bin set 1. The building is rated as a low-hazard facility. It contains low levels of radiation and medium quantities of asbestos in the roof, siding, and piping insulation.

The CPP-646 Instrument Building for 2nd Set of Calcined Solids is a one-story, 91 feet^2 masonry-exterior building. The building houses instrumentation to monitor bin set 2. The building is rated as a low-hazard facility. It contains low levels of radiation and low quantities of asbestos in the roof, siding, and piping insulation.

The CPP-647 Instrument Building for 3rd Set of Calcined Solids is a one-story, 91 feet^2 masonry-exterior building. The building houses instrumentation to monitor bin set 3. The building is rated as a low-hazard facility. It contains low levels of radiation and low quantities of asbestos in the roof, siding, and piping insulation.

The CPP-658 Instrument Building for 4th Set of Calcined Storage is a one-story, 81 feet^2 reinforced-concrete building. The building houses instrumentation to monitor bin set 4. The building is rated as a low-hazard facility. It contains low levels of radiation and low quantities of asbestos in the roof, siding, and piping insulation.

The CPP-671 bin set 5 service building is a one-story, 240 feet^2 prefabricated building The building houses instrumentation to monitor bin set 5. The building is rated as a high-hazard, high-radiation facility. Low quantities of asbestos contamination are present in the roof.

The CPP-673 Service Building for 6th Set Calcined Solids is a one-story, 256 feet^2 metal building. The building houses instrumentation to monitor bin set 6. The building is rated as a low-hazard, low-radiation facility.

Table C.6.2-111. Decontamination and decommissioning project data for the closure of the Instrumentation Building for Bin Set 1 (CPP-639) (P157A).

Table C.6.2-112. Decontamination and decommissioning project data for the Bin Set 2 Instrumentation Building (P157B).

Table C.6.2-113. Decontamination and decommissioning project data for the Bin Set 3 Instrumentation Building (P157C).

Table C.6.2-114. Decontamination and decommissioning project data for the Bin Set 4 Instrumentation Building (P157D).

Table C.6.2-115. Decontamination and decommissioning project data for the Bin Set 5 Service Building (P157E).

Table C.6.2-116. Decontamination and decommissioning project data for the Bin Set 6 Service Building (P157F).

C.6.2.54 Closure of the Process Equipment Waste Group (P158A-E, H)

GENERAL PROJECT OBJECTIVES: The project included activities that would be associated with the deactivation and demolition of the Process Equipment Waste Group.

PROCESS DESCRIPTION: The INTEC Process Equipment Waste complex would be targeted for a landfill closure, except for the Liquid Effluent Treatment and Disposal Building (CPP-1618), which would be targeted for clean closure. The below ground levels of the complex would be grouted with concrete. Subsequently, the above ground portion of the complex would be demolished in place and covered with an earthen cap. The rigid asbestos siding and roofing would be removed and placed in a landfill approved for asbestos disposal. Complete deactivation of the complex would be completed in 2037. Demolition would start in 2038 and would be completed in 2043.

COMPLEX DESCRIPTION: The INTEC Blower Building (CPP-605) houses three uninterruptible power supply blowers and the vessel offgassystems that supports the INTEC. The CPP-605 Blower Building is a 2,622 square-foot, one-story, reinforced concrete building. The building is rated as a low hazard, average radiation facility. The building is adjacent to the CPP-604. All utilities that support CPP-604 pass through CPP-605.

The INTEC Atmospheric Protection Building (CPP-649) houses blowers and ventilation for the Atmospheric Protection System. Ninety percent of the INTEC offgassystem runs through this building. (CPP-605 has its own offgassystem.) The building is a 3,572 square-foot, one-story, reinforced concrete building. The building is rated as a low hazard, average radiation facility.

The INTEC Liquid Effluent Treatment & Disposal Building (CPP-1618) is used to process the overheads from the process equipment waste system. Within the building, the acid is recaptured and transferred to the CPP-659 New Waste Calcining Facility or the Tank Farm.

The primary function of the Process Equipment Waste Evaporator, which is housed in CPP-604, is to separate liquid radioactive waste into two fractions. The high level waste is directed to the Tank Farm. The other fraction is directed to the Liquid Effluent Treatment and Disposal Facility.

The CPP-708 Exhaust Stack/Main Stack is a 250 foot high concrete stack with a stainless steel liner. The diameter of the stack ranges from 27.7 feet as the base and 14 feet at the top. The stack is rated as a high hazard, high radiation facility.

The CPP-756 Pre-Filter Vault is a 3,670 square-foot, below grade concrete vault. The building is rated as a low hazard, average radiation facility.

The CPP-1618 Liquid Effluent Treatment and Disposal Building is a 6,850 square-foot, three-story, steel frame building. The building is rated as a low hazard, low radiation facility.

The CPP-604 Process Equipment Waste Evaporator Building is a 24,275 square-foot, multi-level, steel frame and reinforced concrete building. The building has areas of medium to high asbestos, hazards, and radiation.

Table C.6.2-117. Decontamination and decommissioning project data for the Blower Building (P158A).

Table C.6.2-118. Decontamination and decommissioning project data for the closure of the Atmospheric Protection Building (CPP-649) (P158B).

Table C.6.2-119. Decontamination and decommissioning project data for the Exhaust Stack/Main Stack (P158C).

Table C.6.2-120. Decontamination and decommissioning project data for the Pre-Filter Vault (P158D).

Table C.6.2-121. Decontamination and decommissioning project data for the Liquid Effluent Treatment and Disposal Building (P158E).

Table C.6.2-122. Decontamination and decommissioning project data for the PEW Evaporator Facility (P158H).

C.6.2.55 Performance-Based Closure of the Remote Analytical Laboratory (P159)

GENERAL PROJECT OBJECTIVES: The project included activities that would be associated with the deactivation and demolition of the Remote Analytical Laboratory.

PROCESS DESCRIPTION: Deactivation of the complex would be complete in 1999. Demolition would begin in 2000 and would be completed in 2004.

COMPLEX DESCRIPTION: The Remote Analytical Laboratory (CPP-684) was designed to receive, analyze, and dispose of radioactive samples from the entire INTEC complex in a safe and timely manner. These samples sources include fuel dissolution, first, second, and third cycle extraction raffinate and product solutions, recycled solvents, waste solutions, waste calcination feed, waste calcine and scrub solutions, and Process Equipment Waste Evaporator feed and condensate solutions. The facility houses a cold and warm laboratories, an analytical cell, a waste handling cell, a uranium storage cabinet, and equipment support areas for decontamination and maintenance.

Table C.6.2-123. Decontamination and decommissioning project data for the Remote Analytical Laboratory (P159).

C.6.2.56 Performance-Based Closure and Closure to Land Fill Standards of the Fuel Processing Complex (P160A, C-G)

GENERAL PROJECT OBJECTIVES: The project included activities that would be associated with the deactivation and demolition of the Fuel Processing Complex.

The project addresses four facilities:

- CPP-601: Fuel Processing Facility (P160A & E)
- CPP-627: Remote Analytical Facility (P160C & F)
- CPP-640: Head-End Processing Facility (P160D & G)

PROCESS DESCRIPTION: The complex is currently undergoing deactivation and is targeted for a "land-fill" closure. Deactivation is scheduled to be complete in 2007. The below ground levels of the complex would be clean grouted with concrete. Subsequently, the above ground portion of the complex would be demolished in place and covered with an earthen cap. The ridged asbestos siding and roofing would be removed and either placed in the below ground areas of the existing building prior to grouting or placed in a land-fill approved for asbestos disposal. Demolition would start in 2015 and would be completed in 2025.

COMPLEX DESCRIPTION: The total multi-level building area of the complex is approximately 164,000 feet^2. The above ground areas are approximately 74,800 feet^2. CPP-601 is a steel frame building, while buildings 640 and 627 are constructed of concrete block. The majority of the complex is sided and roofed with a ridged asbestos material, i.e., transite.

The Process Building (CPP-601) contains 25 process cells, numerous corridors, and auxiliary cells that house equipment and controls for separating uranium from fission products. Much of the processing equipment in the building is located in heavily shielded cells and must be operated remotely. Fuel element processing consisted of a series of aqueous process steps. These included dissolution in acid, separation of the fission products from uranium by countercurrent solvent extraction, concentration and interim storage of uranyl nitrate hexahydrate solution, and conversion for the uranyl nitrate hexahydrate to solid uranium trioxide before shipping. The first three process steps for aluminum and zirconium clad fuels are performed in the process cells of CPP-601. CPP-601 contains a low bay area and process/storage cells.

Minimum functions are performed in the building, including monitoring heating and ventilation systems for contamination, supporting analytical activities, and maintaining the process makeup area for the high level waste activities. The building has high radiation areas, chemical contamination (i.e., nitric acid and aluminum nitrate), and high quantities of asbestos contamination in the form of piping insulation and transite siding and roofing. The facility includes treated, potable, and demineralized water system and plant air, steam and power. CPP buildings 604, 605, 621, 640, and 641 are supplied plant services through this building.

Electrolytic dissolution, combustion and dissolution of graphite fuels take place in the Head End Processing Plant (CPP-640), and custom dissolution takes in the Multicurie Cell in CPP-627. CPP-640 contains office space, operating and treatment areas and process cells. It has high levels of radiation contamination and medium quantities of asbestos contamination in the roofing and insulation materials. CPP-627 contains office space, decontamination rooms, a glove box area, the multi-curie cell and cave. It has high levels of radiation contamination and medium quantities of asbestos contamination in the roofing and insulation materials.

Table C.6.2-124. Decontamination and decommissioning project data for the Closure of the Fuel Processing Building to Landfill Standards (P160A).

Table C.6.2-125. Decontamination and decommissioning project data for the Closure of the Remote Analytical Facility Building to Landfill Standards (P160C).

Table C.6.2-126. Decontamination and decommissioning project data for the Closure of the Head End Process Plant to Landfill Standards (P160D).

Table C.6.2-127. Decontamination and decommissioning project data for the Performance-Based Closure of the Fuel Processing Building (P160E).

Table C.6.2-128. Decontamination and decommissioning project data for the Performance-Based Closure of the Remote Analytical Facility Building (P160F).

Table C.6.2-129. Decontamination and decommissioning project data for the Performance-Based Closure of the Head End Process Plant (P160G).

C.6.2.57 Fluorinel Dissolution Process and Fuel Storage Facility Closure (P161A, B)

GENERAL PROJECT OBJECTIVES: The project addresses the deactivation and demolition of the Fluorinel Dissolution and Fuel Storage Complex.

PROCESS DESCRIPTION: The complex is scheduled to complete deactivation in 2010. Demolition would begin in 2011 and would be completed in 2017.

The project addresses three facilities:

- CPP-666: Fuel Storage Area (P161A)
- CPP-666: Dissolution Process Area (P161A)
- CPP-767: Fluorinel Dissolution Process and Fuel Storage Facility Stack (P161B)

The Fuel Storage and Dissolution Process Facility would be targeted for closure to landfill standards, except for the facility stack which would be clean closed.

COMPLEX FUNCTION: The Fluorinel Dissolution Process and Fuel Storage building was a combination of fuel storage and fuel dissolution process area. The Fuel Storage Area provides facilities for receiving, preparing for storage, transferring, storage, and preparing for processing. The Fluorinel Dissolution Process Area consists of facilities for processing irradiated fuels. The resulting product could be characterized as a hydrofluoric-nitric acid solution containing dissolved zirconium, uranium, and other nuclides. Subsequently, this product was transferred to CPP-601 for further processing.

COMPLEX DESCRIPTION: The total multilevel area of the CPP-666 complex is approximately 175,000 feet^2. The complex is a combination of reinforced concrete and structural steel exterior walls. The complex was designed to provide office space, underwater fuel storage, and fuel dissolution areas. The entire fuel basin area, fuel dissolution cell, fuel handling area, air handling system area, and water treatment system area are radiologically contaminated.

The complex has potable, raw, treated, demineralized, and fire water systems; a steam/condendate system; plant air; and 480-volt power service. Special complex equipment includes two 25-ton cranes, one 130-ton overhead crane, several manipulators, cask handling equipment, water treatment system, high-efficiency particulate air filtration system, numerous basin filled with water for the storage of spent nuclear fuel, and a heavily shielded area for fuel dissolution and dissolution. The stack (CPP-767) is a simple steel stack.

Table C.6.2-130. Decontamination and decommissioning project data for the Performance-Based Closure of the Fluorinel Storage Facility (P161A).

C.6.2.58 Closure of the Transport Lines Group (P162A-D)

GENERAL PROJECT OBJECTIVES: The project will address the deactivation and demolition of the Transport Lines Group.

PROCESS DESCRIPTION: Deactivation of the complex would be completed in 2037. Demolition would be scheduled to start in 2038 and would be completed in 2043.

The project addresses seven transfer lines:

- High-Level Liquid Waste (Raffinate) Lines (P162A)
- Calcine Solids Transport Lines (P162B)
- Process Off Gas Lines (and drains) (P162C)
- Vessel Off Gas Lines (P162D)

COMPLEX FUNCTION: The transport lines are used to transport solid waste, liquid waste, and process offgas from the process facility to the treatment or storage facility.

COMPLEX DESCRIPTION:

High-Level Liquid Waste (Raffinate) Lines: The two original 1, 2, & 3 cycle raffinate lines between CPP-601 and CPP-604 were replaced about 1982. They were capped and abandoned in place and may have several places in the line that have been cut and capped.

Two-2” diameter stainless steel pipelines replaced the original raffinate lines. The new lines are encased in 4” stainless steel pipe, which is buried directly in the ground (approximately 6-12 feet deep). The lines are approximately 300 feet long and some portion of them would remain in service until all of the processes that create liquid waste would be shut down and closed. The sections of the lines that would no longer be needed would be capped and abandoned in place.

Calcine Solids Transport Lines: There are two calcined solids transport lines between the Waste Calcine Facility and bin sets 1, 2, 3, and 4. The stainless steel lines are 3 to 4 inches in diameter and inserted into clay tile sleeves. Each line is encased in concrete (approximately 3 feet by 3 feet) and buried at a depth of approximately four feet. These lines would be capped and abandoned in place.

There are two calcined solids transport lines between the New Waste Calcining Facility and bin sets 4, 5, 6, and 7. The stainless steel lines are 3 to 4 inches in diameter and inserted into clay tile sleeves. Each line is encased in concrete (approximately 3 feet by 3 feet) and buried at a depth of approximately four feet. These lines would be capped and abandoned in place.

Calciner Process Off-Gas Lines: The Process Off-Gas lines run from CPP-633 and CPP-659 to the Process Atmospheric Protection System filter system in CPP-649. The 10-inch diameter, stainless steel line from Waste Calcining Facility is directly buried in the ground, the 12-inch diameter stainless steel line from New Waste Calcining Facility has a secondary containment of 20-inch stainless steel pipe which is encased in concrete (approximately 3 feet by 3 feet) at a depth of approximately 8 to 10 feet. The lines are approximately 300 to 500 feet long. Clean closure would require the line to be flushed, capped, and abandoned in place.

Vessel Off-Gas Line: The Vessel Off-Gas line runs from CPP-601 to the Vessel Off-Gas filter system in CPP-604. The 8-inch diameter, stainless steel line has a secondary containment of clay tile which is encased in concrete (approximately 3 feet by 3 feet) at a depth of approximately 8 to 14 feet. The line is approximately 300 feet long. Clean closure would require the line to be flushed, capped, and abandoned in place.

Dissolver Off-Gas Lines: The “C & D” and RALA Dissolver Off-Gas lines run from CPP-601 to the CPM Dissolver Off-Gas filter system in CPP-604. The 4-inch diameter stainless lines have a secondary containment of clay tile which are encased in concrete (approximately 3 feet by 3 feet) buried in the ground at a depth of approximately 8 to 14 feet. The lines are approximately 300 feet long. The performance-based closure requires the lines to be flushed, capped, and abandoned in place.

The “E- Dissolver Off-Gas” and “CPM Dissolver Off-Gas” lines are 2-inch and 4-inch stainless steel lines are routed through the CPP-601 vent tunnel and then overhead along the vent duct to the filtering systems in CPP-604. The lines are approximately 300 feet long. Clean closure would require the lines to be flushed, capped, and abandoned in place. The overhead portion would be removed during closure.

Overhead Pneumatic Transfer Lines: The overhead pneumatic transfer lines are used to transport radioactive samples from various INTEC facilities to the Remote Analytical Laboratory.

CPP-1776 Utility Tunnel System throughout Chem Plant: The utility tunnel runs throughout the INTEC complex. The tunnel contains steam, condensate, sewer, water, and electric services. There is approximately 5000 linear feet of utility tunnel with a cross-section of 10 feet by 10 feet.

Table C.6.2-131. Decontamination and decommissioning project data for the Closure of the High-Level Waste (Raffinate) Lines (P162A).

Table C.6.2-132. Decontamination and decommissioning project data for the Closure of the Calcine Solids Transport Lines (P162B).

Table C.6.2-133. Decontamination and decommissioning project data for the Closure of the Process Offgas Lines and Drains (P162C).

Table C.6.2-134. Decontamination and decommissioning project data for the Closure of the Vessel Offgas Lines (P162D).

C.6.2.59 Performance-Based Closure and Closure to Landfill Standards of the New Waste Calcining Facility (P165A & B)

GENERAL PROJECT OBJECTIVE: These projects address the deactivation, decontamination, and demolition of the New Waste Calcining Facility. Activities supporting performance-based closure of the facility are covered by P165A while closure of the New Waste Calcining Facility to landfill standards is covered by P165B.

COMPLEX DESCRIPTION: The primary function of the New Waste Calcining Facility (CPP-659) is to calcine high-level liquid waste. The CPP-659 facility, which was built in 1980, is a combination of reinforced concrete and structural steel exterior walls. As a replacement facility for the Waste Calcining Facility, the new facility houses the calciner, the high-level liquid waste evaporator, the filter leach system, associated process equipment, equipment decontamination area, and heating/ventilation and air-conditioning equipment.

PROJECT DESCRIPTION:

P165A – Performance-based closure: The performance-based closure project option includes deactivating and decontaminating the New Waste Calcining Facility, cleaning tanks and vessels to lowest levels possible, filling the below-ground portion of the facility and associated tanks and vessels with clean, non-radioactive grout, and demolishing the above-ground portion of the facility.

P16B – Closure to landfill standards: The closure to landfill standards project option includes deactivating and decontaminating the New Waste Calcining Facility, flushing and eliminating free liquids in tanks and vessels, filling the below-ground portion of the facility and associated tanks and vessels with clean, non-radioactive grout, and demolishing the above-ground portion of the facility.

Table C.6.2-135. Decontamination and decommissioning project data for the Performance-Based Closure of the New Waste Calcining Facility (P165A).

Table C.6.2-136. Decontamination and decommissioning project data for the Closure to Landfill Standards of the New Waste Calcining Facility (P165B)

References

EDF-PDS-B-001, *Draft Project Summary and Project Data Sheets for Risk-Based Clean Closure and Subsequent Class A Grout Placement in Tank Farm and Calcined Solids Storage Facilities (P26)*, Rev. 4, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-B-002, *Draft Project Summary and Project Data Sheets for Risk-Based Clean Closure and Subsequent Class C Grout Placement in Tank Farm and Calcined Solids Storage Facilities (P51)*, Rev. 4, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-B-003, *Draft Project Summary and Project Data Sheet for Clean Closure to Detection Limits of the Calcined Solids Storage Facility (P59F)*, Rev. 0, Lockheed Martin Idaho Technologies Corporation, July 30, 1998.

EDF-PDS-B-004, *Draft Project Summary and Project Data Sheet for Total Removal Clean Closure of the Tank Farm Facility (P59G)*, Lockheed Martin Idaho Technologies Corporation, January 20, 1999.

EDF-PDS-C-002, *Project Data Sheet for Calcine Retrieval and Transport from Bin Sets 1-7 (P59A): bounds P7A, P22A, P33A, P47A, P70A, P79A, P86A, and P99A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-004, *Project Data Sheet and Draft Project Summary for Analytical Laboratory (P18)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-006, *Project Data Sheet (HWO) Updated from the February Version to Show NUS Comments and New PDS Format, and Draft Project Summary (P71)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-007, *Project Data Sheet for Calcine Retrieval and Transport from Bin Sets 1 – 7 (P59A: bounds P7A, P22A, P33A, P47A, P70A, P86A, P99A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1998.

EDF-PDS-C-008, *Draft Project Summary and Project Data Sheet for Risk-Based Closure with Subsequent Clean Fill of the Calcined Solids Storage Facility (P59C)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, May 12, 1998.

EDF-PDS-C-009, *Draft Project Summary and Project Data Sheet for Clean Closure to Detection Limits of the Calcined Solids Storage Facility (P59D)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, May 12, 1998.

EDF-PDS-C-010, *Draft Project Summary Project Data Sheet for Risk-Based Clean Closure with Subsequent Clean Fill of the Tank Farm Facility (P3B)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 10, 1999.

EDF-PDS-C-011, *Draft Project Summary and Project Data Sheet for Closure to Landfill Standards with Subsequent Clean Fill of the Tank Farm Facility (P3C)*, Lockheed Martin Idaho Technologies Corporation, May 21, 1998.

EDF-PDS-C-012, *Draft Project Summary and Project Data Sheet for INEEL Class A/C Near Surface Land Disposal Facility (P27)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 22, 1999.

EDF-PDS-C-013, *Project Data Sheet (DCWO) Updated from the February Version to Show NUS Comments and New PDS Format, and Draft Project Summary (P80)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-018*, Project Data Sheet and Draft Project Summary for Long-term Monitoring of CSSF (P4)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-020, *Project Data Sheet and Draft Project Summary for P1A, Calcine SBW with Upgrades,* Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-023, *Project Data Summary and Draft Project Summary for Analytical Lab for Minimum Compliance Option (P18MC)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-025, *Project Data Sheet and Draft Project Summary for the No-Action Alternative (P1D)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-026, *Project Data Sheet and Draft Project Summary for P1E, Transferring Calcine from Bin Set 1 to Bin Set 7*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-031, *INTEC HLW EIS Facility Closure Studies for PEW Lines (P154)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-033, *INTEC HLW EIS Facility Closure Studies for Tank Farm Group (P156)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-034, *INTEC HLW EIS Facility Closure Studies for Bin Set Group (P157)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-035, *INTEC HLW EIS Facility Closure Studies for PEW Group (P158)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-036, *INTEC HLW EIS Facility Closure Studies for the Remote Analytical Laboratory (P159)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-037, *INTEC HLW EIS Facility Closure Studies for Fuel Processing Complex (P160)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-038, *INTEC HLW EIS Facility Closure Studies for FAST Facility (P161)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-039, *INTEC HLW EIS Facility Closure Studies for Transport Lines Group (P162)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-041, *Draft Project Summary and Project Data Sheet for Risk-Based Closure with Subsequent Clean Fill of Bin Set in the CSSF (P1F)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 10, 1999.

EDF-PDS-C-044, *Project Data Sheet and Draft Project Summary for INEEL Low-Level Waste Disposal Site (P127)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, December 21, 1998.

EDF-PDS-C-046, *Revised Radioactive Air Emissions for Project Data Sheets*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, March 1, 1999.

EDF-PDS-C-048, *Project Data Sheet and Draft Summary for the Calcine Retrieval and Transfer System (Just-in-Time) (P59B)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-C-050, *INTEC HLW EIS FACILITY CLOSURE STUDIES for the New Waste Calcine Facility (NWCF) (P165A and P165B)*, Lockheed Martin Idaho Technologies Corporation, March 2, 1999.

EDF-PDS-C-051, *Revisions to Fuel, Electrical, and Nitric Acid Data in the Separations and Planning Basis Options*, Lockheed Martin Idaho Technologies Corporation, March 15, 1999.

EDF-PDS-D-004, *Project Data Sheets and Draft Project Summary for Alternate SBW Processing and Newly Generated Liquid Waste Management for the Non-Separations Vitrified Waste Option (P111) and the Separations 2006 Plan*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 5, 1999.

EDF-PDS-D-017, *Project Data Sheet and Draft Project Summary for PEW Evaporator and LET&D Operations (P1C)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-D-019, *Draft Project Summary and Project Data Sheets for Treatment of Newly Generated Waste (NGLW) and Tank Farm Waste Heel Waste, (P1B)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-E-001, *Draft Project Summary and Project Data Summary Sheets for Waste Separations Facilities for Projects P9A and P23A*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-E-004, *Draft Project Summary and Project Data Sheet for TRU/Class C Waste Separations Facility (P49A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-E-008, *Draft Project Summary and Project Data Sheets for Separations Organic Incinerator Project (P118)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-F-002, *Project Data Sheet and Draft Project Summary for Early Vitrification of SBW, NGLW, and Calcine (P88)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-F-003, *Draft Project Summary and Project Data Sheets for Vitrification Plant (Projects P9B and P23B)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-F-006, *Process Description – Early Vitrification Facility*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, July 31, 1998.

EDF-PDS-G-001, *Draft Project Summary and Project Data Sheets for Class A Grout Plant (Projects P9C, P23C, and P35C)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-G-002, *Draft Project Summary and Project Data Sheet for Class C Grout Plant (Project P49C)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-G-003, *Supporting Data for the LAWTF Project Summaries and Project Data Sheets (Projects P9C and P23C)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-H-001, *Draft Project Summary and Project Data Sheet for 2006 Vitrified Product Interim Storage (P24 bounds P10)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-H-003, *Draft Project Summary and Project Data Sheet for Interim Storage of Non-Separated HWO (P72)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-H-004, *Draft Project Summary and Project Data Sheet for Unseparated Vitrified Product Interim Storage (P61)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-H-005, *Draft Project Summary and Project Data Sheet for Unseparated Cementitious HLW Interim Storage (P81)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-I-001, *Project Data Sheet and Draft Project Summary for Packaging and Loading Separations HAW for Shipment to NGR (P25A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-I-003, *Draft Project Summary and Project Data Sheets for the Packaging and Loading of (Direct) Vitrified High-Level Waste for Shipment to the National Geologic Repository (P62A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-I-004, *Draft Project Summary and Project Data Sheet for the Packaging and Loading of Hot Isostatic Pressed Waste for Shipment to the National Geologic Repository (P73A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-I-008, *Draft Project Summary and Project Data Sheet for the Packaging and Loading of Cementitious Waste for Shipment to the National Geologic Repository (P83A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-I-009, *Draft Project Summary and Project Data Sheet for the Packaging and Loading of TRU for Shipment to WIPP (P39A bounds P50A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-I-010, *Draft Project Summary and Project Data Sheet for the Packaging and Loading of Vitrified SBW for Shipment to WIPP (P90A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 5, 1999.

EDF-PDS-I-011, *Draft Project Summary and Project Data Sheet for the Packaging and Loading of NGLW Contact Handled TRU to WIPP (P112A)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-I-025, *HAW Denitration, Packaging and Cask Loading Facility Project Summary and Project Data Sheets (P9J)*, Lockheed Martin Idaho Technologies Corporation, December 17, 1998.

EDF-PDS-I-028, *Project Data Sheet and Draft Project Summary for Project P133, Waste Treatment Pilot Plant Facility*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-J-001, *Project Data Sheet and Draft Project Summary for Class A Grout Packaging and Shipping to an INEEL Landfill (P35D)*, Rev. 2, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-J-002, *Project Data Sheet and Draft Project Summary for Class C Grout Packaging and Shipping to an INEEL Landfill (P49D)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-J-003, *Project Data Sheet and Draft Project Summary for Class A Grout Packaging and Loading for Off-site Disposal (P35E)*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, February 3, 1999.

EDF-PDS-L-002, *Revised Data for the High Level Waste Project Data Sheets*, Rev. 1, Lockheed Martin Idaho Technologies Corporation, March 15, 1999.

EDF-WPF-013, *Project Data Sheet and Draft Project Summary for the Minimum INEEL Processing (Calcine Only) Alternative (P117A)*, Lockheed Martin Idaho Technologies Corporation, November 19, 1998.

EDF-WPF-015, *Project Data Sheet and Draft Project Summary for the Minimum INEEL Processing (Calcine Only) Alternative – Just-in-Time (JIT) Option (P117B)*, Lockheed Martin Idaho Technologies Corporation, November 19, 1998.